

## AP Biology Syllabus - Unit 6: Gene Expression and Regulation

### Essential Questions:

1. How does DNA copy itself?
2. How does the information from DNA get converted into traits?
3. What makes the genetics of bacteria and viruses unique?
4. What similarities are shared in the genomes of all eukaryotic organisms?
5. How is our ever-increasing knowledge of DNA changing society?

### Required Reading:

- Chapter 16 (All)
- Chapter 17 (All)
- Chapter 18 (All)
- Chapter 19 (All)
- Chapter 20 (All)
- Chapter 21 (All)

### Homework:

- Unit 6 Guided Reading Questions (Due at end of unit)
- Molecular Biology Pre-Lab Activities - Part A & Part B (Due before school on day of labs)
- Molecular Biology Lab Handout (Due one week after Part B of lab)

**In-Class Work:** BioFlix Study Sheet for DNA Replication, BioFlix Study Sheet for Protein Synthesis

**Online Quizzes:** Chapters 16 & 17, Chapters 18 & 19, Chapters 20 & 21

**Practice Free Response:** Gel Electrophoresis

**AP Lab:** Biotechnology: Bacterial Transformation & Restriction Enzyme Analysis of DNA

### Unit Exam (60 pts):

- 30 Multiple Choice Questions
- 3 Free Response Questions (30 pts - 10 pts per question)

**Schedule:** (See "Weekly Outline" on course website for potential adjustments)

Date	Lesson Topics	Assignments
<b>Tuesday 02/04</b>	-Distribute Unit 6 Syllabus -DNA Models -BioFlix: DNA Replication	-BioFlix Study Sheet for DNA Replication (Due Friday, 02/07) -Read Concepts 16.1-16.3 -Answer Guided Reading Questions (Due Wednesday, 02/05)
<b>Wednesday 02/05</b>	-No School - Chiefs Super Bowl Parade	-Read Concepts 17.1-17.4 -Answer Guided Reading Questions (Due Friday, 02/07)
<b>Block Day 02/07</b>	-Notes: Overview of Protein Synthesis -BioFlix: Protein Synthesis	-BioFlix Study Sheet for Protein Synthesis (Due Monday, 02/10) -Read Concept 17.5 -Answer Guided Reading Questions (Due Monday, 02/10) -Online Quiz #10 (Chapters 16 & 17) (Due Tuesday, 02/11 by 7:45 am)
<b>Monday 02/10</b>	-Notes: Mutations	-Read Concepts 18.1-18.3 -Answer Guided Reading Questions (Due Tuesday, 02/11)
<b>Tuesday 02/11</b>	-Prokaryotic & Eukaryotic Gene Regulation	-Read Concepts 18.4 & 18.5 -Answer Guided Reading Questions (Due Tuesday, 02/12) -Bacterial Transformation Pre-Lab Activity (Due before lab on Wednesday, 02/12)
<b>Block Day 02/12</b>	-Biotechnology Lab Part A: Bacterial Transformation	-Biotechnology Lab Handout: Part A (Bacterial Transformation) (Due Wednesday, 02/19) -Read Concepts 19.1-19.3 -Answer Guided Reading Questions (Due Friday, 02/14) -Online Quiz #11 (Chapters 18 & 19) (Due Wednesday, 02/19 by 7:45 am)
<b>Friday 02/14</b>	-No School - Conferences	

Date	Lesson Topics	Assignments
<b>Monday</b> 02/17	-No School - Presidents' Day	
<b>Tuesday</b> 02/18	-No School - Professional Learning	
<b>Block Day</b> 02/19	-Interpret Lab Results -Finish Biotechnology Lab Handout	-Biotechnology Lab Handout: Part A (Due in class) -Read Concepts 20.1 & 20.2 -Answer Guided Reading Questions (Due Friday, 02/21)
<b>Friday</b> 02/21	-Lecture: DNA Technology & Genomics (Part 1)	-Read Concepts 20.3 & 20.4 -Answer Guided Reading Questions (Due Monday, 02/24)
<b>Monday</b> 02/24	-Lecture: DNA Technology & Genomics (Part 2)	-Read Concepts 21.1-21.3 -Answer Guided Reading Questions (Due Tuesday, 02/25)
<b>Tuesday</b> 02/25	-Introduce Foodborne Outbreak Investigation	-Read Concepts 21.4-21.6 -Answer Guided Reading Questions (Due Wednesday, 02/26) -Gel Electrophoresis Pre-Lab Activity (Due before lab on Block Day)
<b>Block Day</b> 02/26	-Biotechnology Lab Part B: Foodborne Outbreak Investigation	-Biotechnology Lab Handout: Part B (Gel Electrophoresis) (Due Wednesday, 03/04)
<b>Friday</b> 02/28	-Work on Biotechnology Lab Handout	-Online Quiz #12 (Chapters 20 & 21) (Due Monday, 03/02 by 7:45 am)
<b>Monday</b> 03/02	-Unit 6 Practice Free Response (In-Class) -Score Unit 6 Practice Free Response	-Finish Unit 6 Guided Reading Questions (Due Wednesday, 03/04)
<b>Tuesday</b> 03/03	-Review for Unit 6 Exam	-Study for Unit 6 Exam
<b>Block Day</b> 03/04	-Unit 6 Exam	

### Unit 6: Gene Expression and Regulation Learning Objectives

- Describe the structures involved in passing hereditary information from one generation to the next.
- Describe the characteristics of DNA that allow it to be used as the hereditary material.
- Describe the mechanisms by which genetic information is copied for transmission between generations.
- Describe the mechanisms by which genetic information flows from DNA to RNA to protein.
- Describe how the phenotype of an organism is determined by its genotype.
- Describe the types of interactions that regulate gene expression.
- Explain how the location of regulatory sequences relates to their function.
- Explain how the binding of transcription factors to promoter regions affects gene expression and/or the phenotype of the organism.
- Explain the connection between the regulation of gene expression and phenotypic differences in cells and organisms.
- Describe the various types of mutations.
- Explain how changes in genotype may result in changes in phenotype.
- Explain how alterations in DNA sequences contribute to variation that can be subject to natural selection.
- Explain the use of genetic engineering techniques in analyzing or manipulating DNA.