

Science Department
Salem High School
Biotechnology /Microbiology
Norma Bursaw

Course Description:

Biotechnology/Microbiology will follow the New Hampshire Community College curriculum for Microbiology. Students may elect to take this as a Running Start course which is eligible for 4 credits from NHCTC. The course is an overview of microbiology and biotechnology concepts. It will include the fundamentals of microbiology, microbial genomes, microbial diagnosis, genetics, virology, and the use of microorganisms in biotechnology. Students will become familiar with current technology with many opportunities to learn proper techniques during labs.

Course Objectives:

Students will be able to:

1. Explain basic concepts of microbiology (classification, genetics, metabolism, etc.)
2. Explain basic concepts of biotechnology (transformation, cloning, industrial applications, etc.)
3. Demonstrate proper safety techniques and use of biotechnology equipment
4. Conduct labs involving microorganisms and DNA using approved protocols
5. Identify an unknown bacteria sample using previously learned techniques
6. Compare and contrast the cell structures and functions of prokaryotic and eukaryotic cells
7. Discuss current issues in science related to microbiology and biotechnology
8. Maintain a lab notebook
9. Develop good writing skills

Expectations:

- Be on time
- Be prepared for class
- Complete assignments on time
- Participate in class
- Behave appropriately and safely at all times
- Make up work within one week of absence (except in cases of prolonged illness)
- Absences must be excused in order to make up work; some labs cannot be made up due to the materials involved
- Keep lab notebook neat and up to date
- Seek extra help after school if needed

Assessment:

Grading will be done on a point system. All homework, quizzes, tests, labs (including the unknown bacteria investigation), projects, etc. will have an assigned number of points based on the complexity of the assignment. The percent grade will be calculated by dividing the number of points earned by the total number of points possible.

Textbooks:

Daugherty, Ellyn, Biotechnology – Science for the New Millenium. Paradigm Publishing Inc., 2006.

Tortura G., Funke B., and Case C, Microbiology: An Introduction, 9th edition. Benjamin Cummings Publishing, 2007.

* subject to change*

Topic	Daugherty	Tortura
Introduction		
What is Biotechnology/Microbiology	Ch. 1	Ch. 1
Scientific Method		
Bioethics		
Scientific Notebooks		
Lab Safety		
History of Microbiology		
Prokaryotic and Eukaryotic Cells	Ch. 2	Ch. 2, 4, 10
Cells used in biotechnology		
Biochemistry		
Classification		
Basic Skills	Ch. 3, 7	Ch. 3
Measurement tools		
Making solutions		
DNA	Ch. 4	Ch. 8, 9
Structure and Function		
Sources of DNA		
Isolating and Manipulating DNA		
Proteins	Ch. 5	Ch. 5
Structure and Function		
Production of Proteins		
Enzymes		
Microbial Growth & Control		Ch. 6, 7
Cultures and Media		
Unknown bacteria identification		
Prokaryotes, Eukaryotes & Viruses		Ch. 11, 12, 13
Antimicrobial Drugs	Ch. 12	Ch. 20
Interaction Between Microbe & Host		
Principles of Disease & Epidemiology		Ch. 14
Microbial Mechanisms of Pathogenicity		Ch. 15
Nonspecific Defenses		Ch. 16

Specific Defenses		Ch. 17
Practical Applications of Immunology		Ch. 18
Disorders of the Immune System		Ch. 19
Human Diseases (probably done as student presentations)		Ch. 21 - 26
Environmental Microbiology		Ch. 27
Applied & Industrial Microbiology	Ch. 6, 8, 9, 11	Ch. 28
Food		
Fermentation		
Transformation		