General Syllabus for Microbiology - Conneaut School District

Text Information: Microbiology for Health Careers 6th Edition (Grover-Lakomia * Fong) Delmar Publishers

Online Text Book: NA

Course Description: Microbiology is designed to provide students opportunities to learn microbiology and act as scientists to develop a fundamental understanding of structure, growth, and metabolism of a bacterial cell, as well as factors that control growth and the role bacteria play in industry. The curriculum is organized around student needs based on university requirements.

Objectives:

- to give students a breadth and depth study in Microbiology
- to provide common knowledge, scientific and problem solving skills, and investigations within the Microbiology discipline
- to promote national, state, and local science standards that promote unifying concepts at each grade level and within the Microbiology discipline
- to enhance understanding through the use of technology

Standards Addressed: S11 A.1.1.2, S11 A.1.1.3, S11 A.1.1.4, S11.A.1.2.1, S11.A.1.2.2, S11.A.1.3.1, S11.A.1.3.3, S11.A.2.1.2, S11.A.2.1.3, S11.A.2.2.2, S11.A.3.1.1, S11.B.1.1.1, S11.B.1.1.2, S11.B.1.1.3, S11.B.2.1.2, S11.B.2.1.3, S11.B.2.2.3, S11.B.3.1.5, S11.B.3.2.2

Topics Covered:

Unit 1: Foundations (approximately 9 days)

- Historical Timeline
- Scientists and their contributions –Leeuwenhoek, Spallanzani, Jenner, Pasteur, Lister, Koch, Redi
- Microscopy – basic lab techniques (aseptic technique, smear, slide preparation), introductory slides (protists, monerans, fungi)
- Major Theories – Germ theory, biogenesis, spontaneous generation

Unit 2: Bacterial Structure (approximately 10 days)

- External Morphology
- Cell Wall/Gram staining
- Reproductive Shape (tetrad, strep, staph)

Unit 3: Growth and Metabolism (approximately 20 days)

- Affects of factors on growth (temp, ph, O_2, light, etc…)
- Metabolic tests (catalase, fermentation, starch, litmus, etc…)
- Pure cultures (differential media, pour plates (serial dilutions), streak plates (quadrant), filtration (millipore))

Unit 4: Limiting Factors that Control Growth (approximately 15 days)

- Chemotherapeutic (antibiotic, disinfectants, antiseptics)
- Radiation
- Environmental (temp, water, salt, atmospheric, pH)
- Open vs. closed systems – waste products control growth
- Population Dynamics (growth curves)

Unit 5: Immunology & Epidemiology (approximately 15 days)

- Immune response in plants and animals
- Natural resistance in populations
- Biotechnology
- Case studies in epidemiology
- Communable diseases
- Viral Structure and Reproduction

Unit Six: Industrial Uses of Bacteria (approximately 15 days)

- Food production (yogurt, bread, ice cream)
- Water Quality – bacterial counts, serial dilutions, coliform tests
- Soil – winogradsky columns
- Sewage Treatment
- Oil production and bioremediation

Unit Seven: Unknown bacteria experiment (approximately 3-4 days)

- Use a virtual lab simulation to identify an unknown lab culture

Instruction:

- Lecture
- Power point presentations
- Streaming Media
- Demonstrations
- Student inquiry labs/Guided labs
- Videos
- CD-ROM instruction
- Cooperative learning

Assessment:

- Success Tracker (online testing and remediation)
- Projects/independent research (power point presentation, research paper)
- Teacher observation
- Tests
- Quizzes
- Lab activities with writing component

Parent/Student Resources:

- Online Textbook with audio capabilities
- Success Tracker (online assessment tool)
- Online Leveled Readers
- Edline