MICROBIOLOGY

ENVIRONMENTAL MICROBIOLOGY

I. INTRODUCTION
   - A. BACTERIAL DIVERSITY
   - B. BACTERIAL NUMBERS
   - C. INTERACTION WITH THE ENVIRONMENT
   - D. INTERACTION WITH OTHER ORGANISMS

II. SOIL MICROBIOLOGY
   - A. COMPONENTS OF SOIL
   - B. MICROORGANISMS
     1. DEPTH
     2. VARIETY
   - C. ELEMENTAL CYCLES
     1. THE CARBON CYCLE
        - a. $C0_2$ FIXATION
        - b. RESPIRATION
     2. THE NITROGEN CYCLE

        N_2 --> NH_3 --> NO_3 --> $N0_2$ --> N_20 --> N_2

        - a. NITROGEN FIXATION (N_2 -->NH_3)

             RHIZOBIUM, CYANOBACTERIA, DECAY TO NH_3
        - b. NITRIFICATION (TO NO_3)

             NITROSOMONAS
        - c. DENITRIFICATION (NO_3 --> N_2)

             DENITRIFYING BACTERIA--PSEUDOMONADS, BACILLUS
     3. OTHER CYCLES & BIODEGRADATION

III. AQUATIC MICROBIOLOGY
   - A. FRESHWATER FLORA--ZONES
     1. OXYGEN, LIGHT AND NUTRIENTS
     2. SPECIFIC MICROBIAL POPULATIONS
   - B. SEAWATER FLORA--LOWER POPULATION NUMBERS
   - C. PHYTOPLANKTON

IV. WATER QUALITY
   - A. POLLUTION (OR PURITY)
     1. PATHOGENS
     2. CHEMICALS
        - a. NUTRIENTS
        - b. SYNTHETICS AND PETROLEUM
     3. TESTS FOR PURITY
     4. COLIFORMS: IMVIC TEST, LACTOSE WITH GAS
   - B. WATER TREATMENT
     1. FLOCCULATION
     2. FILTRATION
     3. CHLORINATION OR OZONE

V. SEWAGE TREATMENT
   - A. PRIMARY TREATMENT

        SLUDGE & BOD
   - B. SECONDARY TREATMENT

        ACTIVATED SLUDGE

        TRICKLING FILTERS
   - C. TERTIARY TREATMENT