 # 946 SCIENCE 11 – SMALL GROUP

GRADE: 11

LEVEL: **Small Group**

CREDITS: 5

PREREQUISITE: **An Individualized Educational Plan with this component**

BASIC TEXT(S) AND SUPPLEMENTAL READINGS: Biology, Prentice Hall, 2002
Supplemental Texts: Modern Biology, Holt, Rinehart, Winston, 1987, Biology, Heath, 1990

REQUIRED MATERIALS: Scientific Calculator, Notebook, Agenda book, pen

COURSE DESCRIPTION: Students in Science 11 will receive small group instruction which addresses concepts and factual information in a manner consistent with their identified special needs. This course is a general introduction to biological concepts including: cells, plant and animal physiology and behavior, organ systems, reproduction and development, genetics, and the relationships between structure and function in living things. It is designed to provide students with opportunities to help them develop inductive and deductive reasoning skills, the ability to interpret information and practice in forming hypotheses and theories about the natural world.

SCHOOLWIDE LEARNING EXPECTATIONS:
Academic expectations: Students will communicate effectively by gathering information to share in the form of cooperative learning experiences. They will solve complex problems and work with others toward a common goal in the performance of laboratory assignments and small group activities.
Civic expectations: Students will be presented with real-life issues which impact their lives and are related to the topics of the course in order to develop a greater understanding of their responsibilities toward the health and well-being of their community.
Social expectations: Students will identify areas of personal interest through the development of a term project, exercising life skills in setting a goal and creating a plan to reach it in the process. They will respect the rights of those in their school and community by following the rules set forth by the administration and their teacher.

GENERAL PERFORMANCE OBJECTIVES:
1. Apply the scientific method to laboratory situations
2. Apply the use of the microscope to laboratory investigations
3. Describe form and function in typical cells
4. Interpret principles of genetics to real-life situations
5. Hypothesize the models of early life forms
6. Compare theories of evolution
7. Classify and compare vertebrate and invertebrate animals
8. Investigate organ systems of animals by laboratory observations

MASSACHUSETTS CURRICULUM FRAMEWORKS STRAND(S): Biology, Grade 9 or 10

MASSACHUSETTS CURRICULUM FRAMEWORKS STANDARDS:

1. Chemistry of Life: 1.2, 1.3, 1.5
2. Structure and Function of Cells: 2.1, 2.4, 2.6, 2.9, 2.10
3. Genetics: 3.1, 3.3, 3.4, 3.5, 3.6, 3.7
5. Evolution and Biodiversity: 5.1, 5.2, 5.3

UNITS AND THEMES:

I. Nature of Science	Purpose and Nature of Science and Technology
II. Chemical Basis of Life	Chemistry of Life: 1.2, 1.3, 1.5
III. The Cell	Structure and Function of Cells: 2.1, 2.4, 2.6, 2.9, 2.10
IV. Genetics	Genetics: 3.1, 3.3, 3.4, 3.5, 3.6, 3.7
V. Diversity of Life	Evolution and Biodiversity: 5.1, 5.2, 5.3

COURSE OUTLINE

I. Nature of Science
- A. Scientific method
- B. Characteristics of living things
- C. Pure Science and Technology

II. Chemical Basis of Life
- A. Nature of matter
- B. Chemical reactions
- C. Chemical compounds in organisms

III. The Cell
- A. Theory
- B. Structure and function
- C. Levels of organization
- D. Photosynthesis
- E. Respiration
- F. Cell division

IV. Genetics
- A. Mendel's Laws
- B. Human heredity
- C. Chromosome theory
- D. DNA, RNA and Protein Synthesis

V. Diversity of Life
- A. Theories of evolution
- B. The Fossil Record
- C. Speciation
- D. Taxonomy
- E. Five kingdom approach

SUGGESTED INSTRUCTIONAL STRATEGIES:
1. Instructional videotape or television documentary
2. Cooperative learning groups
3. Lecture/Note-taking
4. Independent and small-group research
5. Laboratory investigations
6. Content based games
7. Scaffolding
8. Small group presentations
9. Teacher demonstration/presentation
10. Brainstorming Activities
11. As specified by Individual Education Plan

SUGGESTED INTEGRATION ACTIVITIES:
1. Investigate diseases such as malaria, African sleeping sickness, of dysentery. Using reference material, each group will produce an informative pamphlet about their disease for volunteers working in developing nations. Pamphlets should include disease causing organism, method of infection, symptoms, treatment and preventative measures.

2. After students have completed the presentation of four billion years' worth of earth's history from a scientific viewpoint, randomly assigned groups will predict the next major development in the scientific history of the earth. Each group should assume the role of encyclopedia editors and complete an entry on the History of the Earth for the 200X edition of the XXXXX XXXX encyclopedia.

3. Using preassigned lab groups, students will prepare illustrated obituaries as news releases for assigned endangered species, such as the bald eagle, California condor, African elephant, grizzly bear and panda. Groups should include the scientific classification and name of the species, the habitat, niche, number of survivors, projected date of extinction, projected cause of extinction, notable contributions and an illustration to accompany the piece.

USE OF TOOLS/TECHNOLOGY:
1. Use a classroom computer and an integrated software package
2. Use a basic calculator
3. Use an overhead projector with transparencies
4. View videotape selections
5. Use a computer laboratory
6. Use slide presentation
7. Use the Interactive MCET network for programs such as the Genome Project or Nobel Prize winners

ASSESSMENT TECHNIQUES:
1. Students will take free-response and multiple-choice performance tests.
2. Students will work in cooperative situations and report their results.
3. Students will prepare integration projects.
4. Students will conduct laboratory investigations, perform necessary calculations and write reports.
5. Students will develop and present independent or small group research projects in a variety of formats including videotape clips, poster presentations, one-act dramatizations, audiotape performances and slide shows.