

BEMIDJI AREA SCHOOLS
ADVANCED PLACEMENT CHEMISTRY
Grades 9-12

I. HISTORY AND NATURE OF SCIENCE

A. Scientific Inquiry

Standard: The student will design and conduct a scientific investigation.

The student will:

1. Distinguish between qualitative and quantitative data.

Activity: *Labs conducted have both components*

2. Apply mathematics and models to analyze data and support conclusions.

Activity: *Lab component includes these*

B. Scientific Enterprise

Standard: The student will understand the relationship between science and technology and how both are used.

C. Historic Perspectives

Standard: The student will recognize the historical and cultural context of scientific endeavors and how they influence each other.

II. PHYSICAL SCIENCE

A. Structure of Matter

Standard: The student will understand the nature of matter including its forms, properties and interactions.

B. Chemical Reactions

Standard: The student will describe chemical reactions and the factors that influence them.

The student will:

1. Describe chemical reactions using words and symbolic equations.

Activity: *Assignments on each chapter, review for AP exam*

2. Explain the influence of temperature, surface area, agitation and catalysts on the rate of a reaction.

Activity: *Kinetics Unit*

3. Describe how combining acids and bases produce a neutral solution.

Activity: *Acid/Bases Unit*

C. Energy Transformations

Standard: The student will understand energy forms, transformations and transfers.

The student will:

1. Know that potential energy is stored energy and is associated with gravitational or electrical force, mechanical position or chemical composition.

Activity: *Thermodynamics Unit*

2. Differentiate between kinetic and potential energy and identify situations where kinetic energy is converted into potential energy and vice versa.

Activity: *Thermodynamics Unit*

3. Describe the production, storage and transmission of electricity.

Activity: *Electrochemistry Unit*

4. Be able to describe physical and chemical changes in terms of the law of conservation of energy.

Activity: *Thermodynamics Unit*

5. Describe energy, work and power both conceptually and quantitatively.

Activity: *Thermodynamics & Electrochemistry Units*

D. Motion

Standard: The student will understand the nature of force and motion.

E. Forces of Nature

Standard: The student will understand the forces of nature and their application.

F. Earth Structure and Processes

Standard: The student will understand that the interactions of the atmosphere, biosphere, lithosphere, hydrosphere and space have resulted in ongoing change of the Earth system over geologic time.

G. Earth Structure and Processes

Standard: The student will investigate the impact humans have on the environment.

1. The student will identify and research an environmental issue and evaluate its impact.

H. The Water Cycle, Weather and Climate

Standard: The student will explain the causes and effects of the Earth's atmospheric and hydrologic processes.

I. The Universe

Standard: The student will relate the formation and components of our solar system to the conditions necessary for life.

J. The Universe

Standard: The student will use astronomical data to reveal the structure, scale, and changes in the stars, galaxies and universe over time.

III. LIFE SCIENCE

A. Cells

Standard: The student will comprehend that all living things are composed of cells, and that the life processes in a cell are based on molecular interactions.

B. Diversity of Organisms

Standard: The student will classify, compare and contrast the diversity of organisms on Earth and their modes of accommodating the requirements for life.

C. Interdependence of Life

Standard: The student will describe how the environment and interactions between organisms can affect the number of species and the diversity of species in an ecosystem.

D. Heredity

Standard: The student will explain how inherited characteristics are encoded by genes.

E. Biological Populations Change Over Time

Standard: The student will understand how biological evolution provides a scientific explanation for the fossil record of ancient life forms, as well as for the striking molecular similarities observed among the diverse species of living organisms.

F. Flow of Matter and Energy

Standard: The student will describe and explain the cycling of matter and flow of energy through an ecosystem's living and non-living components.

The student will:

1. Know that all matter tends to become more disorganized over time, and that living systems require a continuous input of energy in order to maintain their chemical and physical organizations and prevent death.

Activity: *Thermodynamics Unit*

G. Human Organism

Standard: The student will understand how all organ systems, including the nervous system, interact to maintain homeostasis.