BEMIDJI AREA SCHOOLS
FORENSICS
Grades 9-12

I. HISTORY AND NATURE OF SCIENCE

A. Scientific World View

Standard: The student will understand the nature of scientific ways of thinking and that scientific knowledge changes and accumulates over time.

The student will:

1. Recognize that in order to be valid, scientific knowledge must meet certain criteria including that it: be consistent with experimental, observational and inferential evidence about nature; follow rules of logic and reporting both methods and procedures; and, be falsifiable and open to criticism.
   General guidelines of forensic techniques
   Forensic Video Critiques
   Who dunit quizzes
   General discussions of techniques and results for various labs

2. Explain how traditions of ethics, peer review, conflict and general consensus influences the conduct of science.
   General guidelines of forensic techniques
   Forensic Video Critiques
   Who dunit quizzes

3. Recognize that some scientific ideas are incomplete, and opportunity exists in these areas for new advances.
   General discussions of techniques and results for various labs

B. Scientific Inquiry

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

The student will:

1. Distinguish between qualitative and quantitative data.
   Fingerprint labs, lip print analysis lab, blood spatter analysis lab, document analysis lab, ballistics activity

2. Apply mathematics and models to analyze data and support conclusions.
   Can foot prints & stride length be used to approximate Height Lab.
   Bone Lab #1, Final projects

3. Identify possible sources of error and their effects on results.
   Can foot prints & stride length be used to approximate Height Lab.
   Bone Lab #1

4. Know that professional scientists and engineers have ethical codes.
   Introduction activities & discussion
   Forensic Fields Research Project

5. Give examples of how different domains of science use different bodies of scientific knowledge and employ different methods to investigate questions.
   Forensic Fields Research Project, Final projects

C. Scientific Enterprise

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

The student will:

1. Compare and contrast the purposes and career opportunities of engineering, technology and science.
   Forensic Fields Research Project

2. Provide an example of a need or problem identified by science and solved by engineering or technology.
   Forensic Fields Research Project
   Crime paper

3. Provide and example of how technology facilitates new discoveries and the development of scientific knowledge.
   Forensic Fields Research Project

4. Know that technological changes and scientific advances are often accompanied by social, political, environmental and economic changes.
   Forensic Fields Research Project
   Crime paper

5. Recognize that science and technology are influenced by cultural backgrounds and beliefs and by social needs, attitudes, values and limitations.
   Forensic Fields Research Project
   Crime paper

II. PHYSICAL SCIENCE

A. Structure of Matter

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

The student will:

1. Identify protons, neutrons and electrons as the major components of the atom, their mass relative to one another, their arrangement and their charge.
   Detecting trace metals lab

III. LIFE SCIENCE

A. Heredity

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

The student will:

1. Explain that the instructions for the characteristics of all organisms are carried in nucleic acids.

2. Define the relationship between DNA, genes and chromosomes.

3. Describe the structure and function of DNA and distinguish between replication, transcription and translation.

4. Know that different species of multicellular organisms have a characteristic number of chromosomes and that in typical humans there are 22 autosomal pairs and 2 sex chromosomes.

5. Describe how genetic information is transmitted from parents to offspring through the process of meiosis and fertilization as they relate to chromosome recombination and sexual reproduction.

6. Use Mendel's laws of segregation and independent assortment to determine the genotype and phenotype of a monohybrid cross.

7. Differentiate between dominant, recessive, co-dominant, incompletely dominant, polygenic and sex-linked traits.
   Blood type related labs
   DNA analysis-electrophoresis lab (when available)

B. Human Organism

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

The student will:

1. The student will understand and describe the basic anatomy and physiology of the nervous system and sense organs.

2. The student will describe how the functions of individual organ systems are integrated to maintain a homeostatic balance in the body.
   Fingerprint labs
   Bone labs 1 & 2
   Stride Length Lab
   Blood type related labs