Plymouth Public Schools' Science and Technology/Engineering Program High School Forensics Learning Standards

STE2073 Forensics College Prep 1

An Introduction to the Massachusetts Department of Elementary and Secondary Education Science and Technology/Engineering Curriculum Framework
Effective teaching and learning in science fosters engagement and has rigor, relevance, and coherence embedded within. It couples practice with content to give the context for performance. A program with these components encourages students to analyze and explain phenomena and experience; engages with practices to build, use, and apply knowledge; and builds a storyline over time and among disciplines. The state standards that form this program are outcomes that reflect what a student should know and be able to do as a result of instruction. Science and engineering practices, which are included in these standards, are not teaching strategies; they are important learning goals and skills to be learned, also as a result of instruction. The standards listed below are not intended to represent an exhaustive list of all that could be included in our district's science program, nor should this list prevent students from going beyond the standards where appropriate. (Excerpts from Curriculum Framework)

Disciplinary Core Ideas – ELECTIVE COURSES
By the end of high school, students should have gained a sufficient knowledge of the science and engineering practices and disciplinary core ideas of science and engineering to engage in public discussions on science-related issues, to be critical consumers of scientific information related to everyday lives, and to continue to learn about science throughout their lives. They do so by enrolling in and successfully completing introductory science courses, as well as application level elective courses. Within these elective courses, students come to appreciate that science and engineering are instrumental in addressing major challenges that confront society today and perhaps so excited and inspired to want to pursue science or engineering-based careers as a result. (Excerpts from National Research Council, A Framework for K-12 Science Education)

LS1. From Molecules to Organisms: Structure and Processes

HS-LS1-2. Develop and use a model to illustrate the key functions of animal body systems, including (a) food digestion, nutrient uptake, and transport through the body; (b) exchange of oxygen and carbon dioxide; (c) removal of wastes; and (d) regulation of body processes.

Clarification Statement:
Emphasis is on the primary function of the following body systems (and structures): digestive (mouth, stomach, small intestine [villi], large intestine, pancreas), respiratory (lungs [alveoli], diaphragm), circulatory (heart, veins, arteries, capillaries), excretory (kidneys, liver, skin), and nervous (neurons, brain, spinal cord).

HS-LS1-3. Provide evidence that homeostasis maintains internal body conditions through both body-wide feedback mechanisms and small-scale cellular processes.

Clarification Statements:
1. Feedback mechanisms include the promotion of a stimulus through positive feedback (e.g., injured tissues releasing chemicals in blood that activate platelets to facilitate blood clotting), and the inhibition of stimulus through negative feedback (e.g., insulin reducing high blood glucose to normal levels).
2. Cellular processes include (a) passive transport and active transport of materials across the cell membrane to maintain specific concentrations of water and other nutrients in the cell and (b) the role of lysosomes in recycling wastes, macromolecules, and cell parts into monomers.

LS3. Heredity: Inheritance and Variation of Traits

HS-LS3-1. Develop and use a model to show how DNA in the form of chromosomes is passed from parents to offspring through the processes of meiosis and fertilization in sexual reproduction.

Clarification Statement:
The model should demonstrate that an individual's characteristics (phenotype) result, in part, from interactions among the various proteins expressed by one's genes (genotype).

PS1. Matter and Its Interactions

HS-PS1-11(MA). Design strategies to identify and separate the components of a mixture based on relevant chemical and physical properties.

Clarification Statements:
1. Emphasis is on compositional and structural features of components of the mixture.
2. Strategies can include chromatography, distillation, centrifuging, and precipitation reactions.
3. Relevant chemical and physical properties can include melting point, boiling point, conductivity, and density.

PS2. Motion and Stability: Forces and Interactions

HS-PS2-3. Apply scientific principles of motion and momentum to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.

Clarification Statement:
Both qualitative evaluations and algebraic manipulations may be used.