

Rationale

In a world filled with the products of scientific inquiry, scientific literacy is a necessity for everyone in order to use scientific information to make wise choices. Today, the job market demands advanced skills, requiring people to be able to learn new skills, use reason, think creatively, make decisions, and solve problems. An understanding of science and the processes of science contribute in an essential way to these skills.

The Biomedical Sciences Program is a sequence of courses which follows Project Lead the Way's proven hands-on, real-world problem-solving approach to learning. The student explores the prevention, diagnosis and treatment of disease working collaboratively to investigate and design innovative solutions for the health challenges of the 21st century.

Course Description

The student explores the concepts of human medicine and are introduced to research processes and to bioinformatics. Hands-on projects enable the student to investigate human body systems and various health conditions, including heart disease, diabetes, sickle-cell disease, hypercholesterolemia, and infectious diseases. Over the length of the course, the students work together to determine the factors that lead to the death of a fictional person.

After pinpointing those factors, the student investigates lifestyle choices and medical treatments that might have prolonged the person's life. The course is designed to provide an overview of all the courses in the Biomedical Sciences Program and to lay the scientific foundation necessary for student success in the subsequent courses. The key biological concepts embedded in the curriculum include homeostasis, metabolism, inheritance of traits, feedback systems, and defense against disease. Engineering principles are also incorporated into the curriculum where appropriate. These include the design process, feedback loops, fluid dynamics, and the relationship of structure to function. Dual credit is available for this course.

Prerequisites

Concurrent enrollment in the appropriate grade-level science course.
Weighted: 0.75

Course Objectives

1. The student will construct a life-size human body poster, showing the location of major systems in the human body and the organs that comprise them with at least 80% accuracy assessed with teacher created rubric.
2. The student will work as a team member to create a visual and oral presentation, containing pictures and text, to explain the major features and functions of a body system with at least 80% accuracy using a rubric. (A+ Speaking)
3. The student will write a summary of the Health Insurance Portability and Accountability Act (HIPAA) with at least 80% accuracy as assessed with teacher developed rubric. (A+ Writing)
4. The student will create two dimensional drawings of the human heart labeling all important structures, comparing and contrasting the characteristics of the different cardiac tissue types with at least 80% accuracy.
5. The student will read about and investigate factors that can impact heart rate and blood pressure and report findings with at least 80% accuracy using a teacher developed rubric. (A+ Reading)
6. The student will identify and sketch red and white blood cells and human tissues viewed under a microscope with at least 80% accuracy.
7. The student will analyze food labels for nutritional content and explain the term Dietary Reference Intake and its importance to good nutrition with at least 80% accuracy.
8. The student will build and analyze molecular models and diagrams of atoms, molecules, simple compounds, carbohydrates, proteins and lipids as assessed through a teacher developed rubric with 80% accuracy.
9. The student will create a detailed outline demonstrating and understanding of the structure and function of enzymes, explaining the importance of enzymes on maintaining homeostasis in the human body with at least 80% accuracy using a teacher developed rubric.
10. The student will create a 3-D working model that demonstrates the role of insulin in transferring glucose from blood into cells with at least 80% accuracy.
11. The student will use appropriate Internet research techniques to obtain information on the symptoms and complications of the sickle cell trait and anemia with at least 80% accuracy. (A+ Research)
12. The student will build a model of the DNA molecule and use appropriate vocabulary to describe its structure with at least 80% accuracy.
13. The student will identify the exons, coding regions, of a gene by comparing the DNA code to the amino acid sequence of the protein with at least 80% accuracy using a teacher developed rubric.
14. The student will interpret molecular structure diagrams and correctly construct three dimensional models of stearic acid, oleic acid, linoleic acid, stearidonic acid, and cholesterol with at least 80% accuracy.
15. The student will produce an accurate and informative PowerPoint presentation about the symptoms, prevalence, prevention, treatment, and the global economic and social impact of an infectious disease caused by a virus with at least 80% accuracy on a

Principles of Biomedical Sciences

Mehlville School District

STEM

Grades 9 - 12, Duration 1 Year, 1 Credit

teacher developed rubric.

16. The student will create a product that demonstrates the steps or stages in the development, trial, and approval of medical interventions with at least 80% accuracy using a rubric.

17. The student will prepare a detailed grant proposal requesting funds for a research project to impact a specific aspect of the disease or medical condition with at least 80% accuracy using a rubric.

BOE 11-30-11