LIVING SYSTEMS COURSE OVERVIEW

The Living Systems course has been developed to support Maryland's adoption of the Next Generation Science Standards (NGSS) and to address the state's graduation requirement for science (COMAR 13A.03.02).

This course redefines the traditional topics in biology, such as cells, biochemistry, genetics, evolution and ecology by adding a modern approach and relevant, real-world applications of phenomena. The NGSS standards addressed by this course include all of the Life Science (LS) Performance Expectations (PEs), as well as a few PEs from the Life Sciences (LS) and Engineering Design (ETS) domains. The NGSS call for an integration of three dimensions - science content, science and engineering practices, and crosscutting concepts is seen in each unit.

The following chart provides information on each unit including the suggested number of 80 to 90-minute class periods.

Unit Title	Unit Summary
Course Intro and Building the Ultimate You (18 classes)	Students learn about the organization and function of body systems and how they interact. They discuss feedback mechanisms for maintaining homeostasis and how body systems utilize these mechanisms. Students learn about what drugs are and how they can impact homeostasis in the body. Students create a model demonstrating how two or more body systems interact. They use this model for the culminating event which tasks them with revising their model to demonstrate the impact of a drug on the functioning of the systems and the body's ability to maintain homeostasis. Finally, students create an infographic to display and communicate their research and conclusions.
You Are What You Eat (16classes)	Using the phenomena of food as our body's source of energy, students explore the transfer of energy from the sun to plants to consumers and the transfer and chemical restructuring of matter in the form of glucose to the various carbon-based molecules our bodies need to survive. Students create a informational brochure about the role of sugar in a healthy diet. Students understand that individual dietary needs may vary according to environmental or biological factors but that the basic needs of a healthy human body remain constant.
Decoding Your Future (15 classes)	Students examine the structure of genes and the role they play in protein synthesis and cell specialization. Students learn about DNA, chromosomes, and the passing of traits from parents to offspring. Students investigate how meiosis, errors during replication, and mutations from environmental factors can lead to inheritable genetic variation. For the culminating event, students construct explanations about the structure of DNA in a genetic disorder and justify whether they would undergo genetic testing for the disorder.
Superbugs (19 classes)	Students explore the variation within and between populations. Students conclude that inherited genetic variation, a result of mutations and sexual reproduction, can lead to the proliferation of those individuals that are better able to survive and reproduce in their environment. Students investigate the factors that contribute to the process of evolution, specifically

	overproduction, genetic variation, competition for limited resources, and natural selection, and describe how these factors interact to cause changes in populations over time. Students examine various types of evidence that show how closely related organisms are to one another. For the culminating event, students design an infographic or short infomercial for the waiting room of a doctor's office that explains the scientific concepts related to the evolution of antibiotic resistant bacteria and why antibiotics must be used properly.
Top Predators (16 classes)	Students investigate the cycling of matter in order to develop an understanding of the movement of atoms and molecules between the biotic and abiotic components of the environment. They compare the cycling of matter to the one-way flow of energy through food webs. Students correlate the change in energy at each trophic level in an ecological pyramid to its impact on biomass. Students learn about factors impacting population size, including the interactions between species and resource availability. Students model how these interactions result in a carrying capacity for each population and overall stability for the entire ecosystem. Students investigate how this stability is altered by biological and physical disturbances of varying magnitudes and how these disturbances impact overall biodiversity. They explain why biodiversity is important to maintaining ecosystem stability. The culminating event requires students to evaluate the reintroduction of the Eastern Cougar in Western Maryland as a management strategy to combat the overpopulation of white-tailed deer.
Capstone Project – Rescue Plan (7 classes)	Students conduct research and create a publication that describes the historical population growth and decline of a threatened or endangered species. Students evaluate current conservation techniques and construct a scientific argument supporting their claim as to the effectiveness of these efforts. Students propose two additional conservation methods to improve the chances of the population recovery for the species. The ultimate goal of their publication is to gain support for the new conservation efforts.