Course Title:	Biology I H
Grade(s):	9-10

Course Description
Biology is the study of living things. Our entire world is composed of complex life that interacts with the physical environment. Throughout this course, students explore patterns found among living organisms. Basic themes addressed include biochemistry, cell biology, genetics, evolution, ecology, classification, the human body, and botany. Laboratories provide students with hands-on activities that improve their experimental research methods and enhance their understanding of the biological world. Honors-level courses are designed to challenge the advanced learner. Students should expect to reach a deeper scope of skills than the academic class: a higher reading stamina, the motivation to revise work, critical thinking skills, and the propensity to finish complex tasks in a timely manner. Students in honors-level classes are expected to have a solid foundation of skills from previous courses and an ability to connect these skills to new learning and apply these skills in problem solving. Students taking an honors-level class have demonstrated the ability to take responsibility for their own learning, work fluidly both independently and collaboratively, and display the propensity to finish complex tasks in a timely manner. These students should consistently aspire to achieve higher-level quality work through self-reflection and self-advocacy. These classes are recommended to students by teachers who have evaluated a student's past practice and achievement.
Approved Curricular Materials/Textbook(s)
Miller & Levine *Biology*

Unit Title	Unit Description (Include Unit Objectives)	Unit Pacing
Unit 1: Intro to Biology	Students will explore the fundamental characteristics and processes that define living organisms. They will investigate how all living things are organized, use energy, grow and develop, respond to their environment, reproduce, and adapt over time. Students will model and analyze processes such as metabolism, cellular respiration, and homeostasis to understand how life is maintained at the cellular and organismal levels. In addition, students will review the practices of scientific investigation, including asking testable questions, designing	2 weeks (September)

	experiments, collecting and analyzing data, and constructing evidence-based explanations. By the end of the unit, students will be able to explain how the characteristics and processes of life distinguish living systems from nonliving matter and how scientific methods allow us to investigate and understand these phenomena.	
Unit 2: Ecology	Students will investigate how the reintroduction of gray wolves to Yellowstone National Park serves as a powerful example of ecosystem interdependence and change. Through this unit, students will analyze how the return of a keystone species influenced population dynamics, trophic cascades, and biodiversity across multiple levels of the ecosystem, including plants, herbivores, predators, and abiotic factors. Students will use ecological data, case studies, and systems models to explain cause-and-effect relationships, evaluate human decision-making in wildlife management, and construct evidence-based explanations for observed ecological changes. By the end of the unit, students will apply these understandings to predict the outcomes of introducing or removing species in other ecosystems and to argue for sustainable environmental management practices using scientific reasoning.	5 weeks (September-October)
Unit 3: Classical Genetics	Students will explore how patterns of inheritance explain the visible diversity within the Roloff family by examining classical genetics principles such as traits, alleles, dominance, recessiveness, segregation, and independent assortment. Through modeling family pedigrees, analyzing real-world–style genetic scenarios, and interpreting probability, students will explain how genetic variation can arise among siblings who share the same parents. Students will use Punnett squares and other representations to predict inheritance patterns, distinguish between genotype and phenotype, and evaluate how chance and recombination contribute to variation within families. By the end of the unit, students will construct evidence-based explanations for why family members can look and develop differently, applying Mendel's laws to make sense of biological diversity observed within a single family lineage.	5 weeks (October-November)
Unit 4: Modern Genetics	Students will investigate how information stored in DNA is expressed as observable traits and how modern biotechnologies allow humans to read, modify, and apply that information. Centered on the flow of genetic information from DNA to RNA to protein, students will model the central dogma to explain how genes	9 weeks (December-January)

	influence structure and function in organisms. Students will analyze how mutations, gene regulation, and environmental factors affect protein production and phenotype. Building on this foundation, students will evaluate modern genetic applications—including genetic engineering, CRISPR-Cas9 gene editing, cloning, and gene therapy—to explain how scientists intentionally alter DNA and why these technologies matter in medicine, agriculture, and conservation. By the end of the unit, students will use evidence to assess the benefits, limitations, and ethical considerations of modern genetic technologies and construct scientifically grounded arguments about their responsible use in society.	
Unit 5: Evolution	Students will examine how populations change over time and how evolutionary processes explain both the unity and diversity of life on Earth. Through evidence drawn from fossils, comparative anatomy, embryology, molecular biology, and observable examples of natural selection, students will explain how variation, inheritance, and environmental pressures drive evolutionary change. Students will model mechanisms such as natural selection, genetic drift, mutation, and gene flow to predict how traits become more or less common within populations across generations. Using real-world case studies, students will analyze how evolutionary theory explains adaptation, speciation, and extinction. By the end of the unit, students will construct evidence-based explanations and arguments that evolution is a unifying framework of biology and apply evolutionary reasoning to issues in medicine, agriculture, and conservation.	2 weeks (January-February)
Unit 6: Biochemistry, Cells, and Cell Transport	Students will investigate how living things grow and obtain the matter and energy needed for life by examining the molecular and cellular processes that power living systems. Centered on the phenomenon *"How do beans grow and where do they get their energy?"*, students will analyze how biomolecules such as carbohydrates, lipids, proteins, and nucleic acids are built from smaller subunits and how their structures relate to function within cells. Students will model photosynthesis and cellular respiration to explain how energy from sunlight is transformed into chemical energy and used to drive growth, maintenance, and reproduction. Students will also explore cellular transport mechanisms—including diffusion, osmosis, facilitated diffusion, and active transport—to explain how cells acquire raw materials like water, carbon dioxide, and nutrients and maintain internal balance. By the end of the unit, students will use evidence from investigations and models to construct explanations for how matter cycles and	8 weeks (February-March)

	energy flows from the environment into bean plants and through their cells, connecting biochemistry, cellular processes, and transport to observable growth and development.	
Unit 7: Digestion and Feedback Loops	Students will investigate how the human digestive system breaks down food, absorbs nutrients, and maintains internal balance through coordinated physiological processes. Students will model the roles of organs, enzymes, hormones, and accessory structures in digestion. They will explore how feedback loops—both negative and positive—regulate processes such as enzyme secretion, stomach acid production, and blood sugar levels to maintain homeostasis. Students will analyze real-world data, simulate digestive processes, and construct cause-and-effect explanations for how disruptions in these feedback systems can impact health. By the end of the unit, students will use evidence to explain how the digestive system integrates with other body systems and employs feedback mechanisms to ensure proper nutrient processing, energy availability, and overall physiological balance.	4 weeks (March-April)
Unit 8: Circulatory, Respiratory, and Immune Systems	Students will explore how the circulatory, respiratory, and immune systems work together to deliver oxygen and nutrients, remove waste, and protect the body from disease. Students will analyze the structure and function of the heart, blood vessels, lungs, and immune cells, modeling how these systems transport materials, facilitate gas exchange, and respond to pathogens. They will examine how feedback mechanisms and inter-system communication maintain homeostasis, including regulation of blood pressure, oxygen levels, and immune responses. Students will use data, simulations, and evidence-based reasoning to explain how disruptions in these systems can impact overall health. By the end of the unit, students will construct explanations and arguments describing how the circulatory, respiratory, and immune systems interact to sustain life and maintain internal balance.	4 weeks (May-June)