

**MEDFORD HIGH SCHOOL
COURSE SYLLABUS**

Department:	Science
Course Title:	Biology MCAS Review
Level and/or Grade:	Standard
Prerequisite:	Concurrent enrollment in Biology I; Placement based on previous MCAS performance and/or student selection.

Course Description:

The Biology MCAS Review course prepares students for the Biology MCAS test. Students will encounter standards in the areas of The Chemistry of Life, Cell Biology, Genetics, Anatomy and Physiology, Evolution and Biodiversity, and Ecology. Students will apply test-taking strategies to sample multiple choice and extended response items. The study of specific topics will also be based on students' prior performance on MCAS as detailed Item Analyses and/or performance on a pretest given at the start of the course.

Learning Standards: Students will be able to.....

The Chemistry of Life

- Recognize the six most common elements in organic molecules: C, H, N, O, P, S.
- Describe the composition and functions of carbohydrates, lipids, proteins, and nucleic acids.
- Explain the role of enzymes in biochemical reactions.

Cell Biology:

- Relate cell parts/organelles to their functions; describe how cells function in a narrow range of physical conditions such as temperature and pH, to perform life functions that help maintain homeostasis.
- Explain the role of cell membranes as a highly selective barrier.
- Differentiate between prokaryotic cells and eukaryotic cells; distinguish between plant and animal cells.
- Use cellular evidence and modes of nutrition to describe various kingdoms.
- Explain the interrelated nature of photosynthesis and cellular respiration.
- Identify the reactants and products in the general reaction of photosynthesis.
- Provide evidence that the organic compounds produced by plants are the primary source of energy and nutrients for most living things.
- Describe and compare the processes of mitosis and meiosis, and their role in the cell cycle.
- Compare and contrast a virus and a cell in terms of genetic material and reproduction.
- Recognize that while viruses lack cell structure, they have the genetic material to invade living cells.

Genetics:

- Describe the structure and function of DNA; describe the processes of replication, transcription,

and translation and how they relate to each other in molecular biology; explain mutations in DNA sequence.

- Differentiate between dominant, recessive, co-dominant, polygenic, and sex-linked traits.
- State Mendel's laws of segregation and independent assortment.
- Use a Punnett Square to determine the genotype and phenotype of monohybrid crosses.

Anatomy & Physiology:

- Explain how the major organ systems in humans have functional units with specific anatomy that perform a function of that organ system.
- Be familiar with parts of the digestive, circulatory, respiratory, nervous, muscular, sexual reproductive systems: generalize their functions.
- Describe how the functions of individual systems within humans are integrated to maintain homeostatic balance in the body.

Evolution and Biodiversity:

- Explain how the fossil record, comparative anatomy, and other evidence support the theory of evolution.
- Describe how the taxonomic system classifies living things into domains and kingdoms based on morphological, behavioral, and molecular similarities.
- Illustrate how genetic variation is preserved or eliminated from a population through Darwinian natural selection resulting in biodiversity.

Ecology:

- Identify factors in an ecosystem that influence fluctuations in population sizes.
- Analyze changes in an ecosystem resulting from natural causes, changes in climate, human activity, or introduction of non-native species.
- Use a food web to identify and distinguish producers, consumers, and decomposers.
- Explain how symbiotic behavior produces interactions within ecosystems and how biotic and abiotic factors cycle in an ecosystem (water, carbon, oxygen, nitrogen).

Course Alignment with High School 21ST Century Learning Expectations:

Students will...

- Become self-directed learners.
- Communicate effectively.
- Apply problem-solving skills and critical and creative thinking.
- Use technology appropriately as a tool for learning, collaboration, presentation, research, and design.
- Act with integrity, respect and responsibility toward themselves, others and the environment.
- Exhibit flexibility and adaptability.
- Collaborate in diverse groups to share knowledge, build consensus, and achieve goals.
- Practice leadership in and service to their community.
- Become contributing citizens in a global society.

Assessment:

- See grading policy attached.