



Advanced Biology: Molecular and Cellular

Course Description:

Molecular and Cellular Biology is a one semester rigorous second year, college-level biology course with a significant emphasis on biochemistry and thermodynamics. Through an evolutionary lens, students will begin with an in-depth study of energy transformations in biological processes, the structure and function of proteins, and end with investigations into specific biochemical pathways involved in cell functioning and communication. Students will be introduced to methods and experimental techniques used in research, have opportunities to design and implement independent inquiries, and learn how to perform statistical analyses of their results.

Course Topics

This course will include research and investigation into the following areas: Thermodynamics as applied to Biochemistry, Cellular Structure and Macromolecules, Cellular Energy (Photosynthesis and Cellular Respiration), Membranes, Transport and Cellular Signaling, and pH and Homeostasis.

Course Expectations

Students will begin to read primary scientific literature, compose annotated bibliographies, and communicate their findings in the form of scientific papers or presentations. Due to the rigor and pace of this course, there is an additional required time commitment. Students will be expected to perform labs / activities and adhere to all proper safety protocols. Student will have approximately 60 minutes of homework after each class meeting.

Prerequisites:

Biology: The Living Earth, Integrated Math 2, Chemistry: In the Earth System

Textbooks / Provided Materials

Principles of Biochemistry, David Nelson and Michael Cox, 5th Edition 2008

Essentials of Cell Biology, C.M. O'Connor and J.U. Adams 2010

Microsoft Office 365 Suite / OneNote for notes and work completion

Required Materials

Scientific Calculator (TI-30XIIs equivalent or better)

Suggested Materials

Apple or PC tablet with pen feature, or a pen/pad USB plug-in. These devices will increase the student's productivity for organization and work completion.

High Bluff Academy is accredited by the Western Association of Schools and Colleges (WASC). The above course is approved by the University of California system (A-G) and the National Collegiate Athletic Association (NCAA).