

Title ***Exploring Creation With Biology, 2nd Edition***
ISBN 978-1-932012-54-5 (student text) 978-1-932012-55-2 (answer key)

Science Credits	1
Lab Credits¹	1
Honors Designation²	Yes
Science Type	Life

This college-preparatory, laboratory-based biology course offers the student who has completed pre-algebra a firm foundation in general biology. It begins with a thorough discussion of the properties of life as well as the way scientists classify living creatures, including both the five-kingdom approach as well as the three-domain approach. It then transitions into a detailed study of prokaryotic cells, including bacteria, archaebacteria, metabolism, reproduction, transformation, transduction, spore formation, and various classification schemes.

The student is then taught about single-celled eukaryotic organisms. Once again, metabolism and reproduction are discussed, and the student learns about the major phyla of algae and protozoa, concentrating on how to recognize their differences. Organelles that tend to exist only in single-celled eukaryotes (such as contractile vacuoles) are discussed as well.

The text then moves on to fungi, starting with their cellular characteristics. The various forms of hyphae are then discussed, followed by a survey of the major phyla of fungi. To prepare the student for a detailed discussion of DNA and the general characteristics of eukaryotic cells, basic chemistry is then covered. The student learns the distinction between atoms and molecules as well as the differences between chemical and physical change. The chemistry related to photosynthesis is discussed, as well as the chemical reactions that both build up and tear down biologically-important molecules like carbohydrates, lipids, and proteins. Finally, the structure of DNA is covered.

This leads to a detailed discussion of the eukaryotic cell, covering the morphology and functions of the major organelles, as well as the differences between plant cells and animal cells. All four stages of aerobic cellular respiration are then covered in detail. The text then moves on to the central dogma of molecular biology, detailing all stages of protein synthesis. The student then learns the purposes of mitosis and meiosis as well as the detailed steps of each process. Viruses are then discussed.

Once the student understands the cellular basis of reproduction, he or she learns Mendelian genetics as well as many exceptions to the general Mendelian rules. With the necessary knowledge of genetics under the student's belt, he or she is then taught the theory of evolution, learning the distinction between microevolution and macroevolution as well as the evidence that relates to both.

The text then moves to a discussion of ecology, emphasizing the relationships between organisms and their physical environment as well as the relationships among organisms within ecosystems. Symbiosis is discussed, with particular emphasis on mutualism. A survey of the animal and plant kingdoms follows. Invertebrates are introduced, with emphasis on the porifera, cnidarians, annelids, flatworms, nematodes, and molluscs. Then a detailed study of arthropods is given, using the crayfish as the general model. The text also gives an introduction to the study of insects.

After the invertebrates, the chordates are discussed. This discussion begins with an analysis of urochordates and cephalochordates, but the majority of material covers the vertebrates. The general

vertebrate skeletal, circulatory and nervous systems are covered, as well as the various reproductive strategies that are found among vertebrates. The major vertebrate classes are discussed, using the fish and frog as models.

The text then transitions to plants, covering the structure and function of leaves, stems, and roots. The classification of plants is then covered. After that, the physiology of plants is covered, giving special attention to water use, reproductive strategies, and germination. The text ends with a survey of reptiles, birds, and mammals.

There are a total of 37 experiments in the course, comprising approximately 40 hours of laboratory instruction. These experiment can be put into one of three groups: (1) experiments that use only household items, (2) experiments that use a microscope and related equipment, and (3) experiments that use a dissection kit, including four specimens (earthworm, crayfish, fish, frog). For this to be considered a laboratory-based high school course, the experiments from at least two of those groups must be completed.

¹To qualify as a lab credit, at least two of the three types of the experiments discussed above must be performed. Those experiments must be fully documented in a laboratory notebook, as discussed in the introduction to the text.

²To qualify as an honors credit, all modules must be completed, the tests must be taken closed book, and all experiments must be performed. Those experiments must be fully documented in a laboratory notebook, as discussed in the introduction to the text. In addition, a grade of B or higher must be earned following the pedagogy in the answer key.