

Title ***Discovering Design With Biology***
ISBN 979-8-9852529-4-1 (student text) 979-8-9852529-5-8 (answer key)

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

This college-preparatory, laboratory-based biology course offers school students a rigorous introduction to the general study of biology. It begins with a discussion of the general characteristics of living things, the way the living world is organized, the way we scientifically study organisms, how we classify them, how energy flows throughout creation, and the way natural selection works.

Students then learn the basic chemical principles they need to understand the properties of carbohydrates, lipids, proteins, and nucleic acids (including DNA). The scientific problems associated with the idea that random chemical reactions can produce living systems are also discussed. Once students have this basic chemical knowledge, they are ready to learn about prokaryotic and eukaryotic cells. This leads to a discussion of the processes of both photosynthesis and cellular respiration.

The cell cycle is then discussed, including a detailed description of mitosis, which is then followed with an equally detailed discussion of meiosis. The ways in which meiosis occurs in people is then described. This leads to a discussion of genetics, both Mendelian and non-Mendelian. Various mutation mechanisms and their effects are also covered. Modern biotechnology and genetic engineering tools are then covered, culminating in a discussion of bioethics.

With the molecular, cellular, and genetic issues covered, students are then given a survey of the known organisms. They begin with the archaea, followed by bacteria, then protists and fungi, then invertebrate animals, then vertebrate animals, and then humans. When humans are discussed, special attention is given to the fact that while they have organ systems similar to other mammals, they have something no other mammal has: the Image of God. Plants are then covered, followed by environmental science and a survey of the world's biomes. Throughout all these discussions, the scientific difficulties with the idea of evolution as a creation myth are discussed.

There are a total of total of 38 experiments that require roughly 40 hours of laboratory work. Of those experiments, 17 use household items. These include extracting DNA from fruit, determining the effects of temperature and pH on proteins, exploring reflexes, and exploring the effect of surface area on diffusion. There are 14 experiments that use a microscope kit, including identifying different stages of mitosis, examining bacteria cultures, studying blood, and studying invertebrates. The other 7 experiments use a dissection kit and include the earthworm, crayfish, fish, and frog.

¹To qualify as a lab credit, two of the three kinds of labs (household, microscope, and dissection) must be completed.

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.