

Title ***Discovering Design with Earth Science***

ISBN 978-0-9962784-3-0 (student) 978-0-9962784-4-7 (answer key)

Science Credits	1
Lab Credits	1
Honors Designation	No
Science Type	Physical

This course, which can be used for high school credit, is designed to give students a general introduction to how the earth has been designed as a haven for life. It begins with a study of the earth's basic layout (crust, mantle, and core), and then it focuses on the crust, allowing students to explore the physical and chemical natures of minerals and rocks. This leads to a study of the rock cycle.

Once students understand the nature of the earth's crust, they learn about plate tectonics. They not only learn the history of how earth scientists developed this surprising theory, but they also see how the Global Positioning System (GPS) directly confirms it. Students are then introduced to some of the consequences of plate tectonics, including seafloor spreading, rifts, trenches, volcanoes, and earthquakes. Along the way, they learn the basic structure of the mantle and core as well as how we determined it by studying seismic waves.

After that, students learn about fossils, how they form, and where they are found. This leads to a discussion of how scientists interpret the rock and fossil record. Students learn the old-earth and young-earth interpretations, and they are shown the data that support and contradict each. While the author has his own view, he tries to present both interpretations in as unbiased a way as possible, hoping for the students to investigate this issue more thoroughly throughout their academic career.

After a firm grounding in geology, students are taught about the the earth's hydrosphere. They learn about the amazing properties of water and the various ways the earth stores it. This leads to a discussion of the oceans, which hold most of the earth's water. Along the way, they learn about tides, currents, glaciers, icebergs, and the water found in the atmosphere. This leads to a discussion of the earth's atmosphere. Students learn the difference between climate and weather, after which the focus becomes weather, including pressure, precipitation, winds, air masses, weather fronts, and severe weather. Global warming is addressed, and the students are shown how little we understand it.

To put all this in perspective, the course ends with a discussion of the solar system and its place in the universe. Students are given perspective when it comes to the size of the planets, the solar system, and what we know of the universe. They learn the basic layout of the solar system and the properties that make the sun so special. They also learn about other stars, how they are classified, and the basics about their motion and appearance in the night sky.

There are 56 laboratory exercises in the book, which correspond to about 45 hours of laboratory work. In order to do these experiments, students must have the laboratory kit that has been made for the course. Experiments include testing rocks and minerals for their physical and chemical properties, analyzing real fossils in a detailed manner, measuring the densities of rocks and liquids and seeing how that affects their behavior, forming clouds in a bottle, exploring the Coriolis effect, exploring the properties of magnets, making a spectrometer, modeling radioactive decay, and investigating the effects of air pressure.