Earth Science, 4th Edition

Lesson Plan Overview

| Day(s) | Topic | Pages | Support Materials | Bible Integration |
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| Unit 1: Introduction to Earth Science |
| Chapter 1: The World of Earth Science |
| 1 | 1A Why Study Earth Science? | 3–6 | \*Lab 1A: Feeding the World Through Earth Science |  This chapter is critical for shaping your students’ worldviews this year. Open your study of the book by focusing on three big topics: using science to obey the Creation Mandate, to glorify God, and to help other people. Have students discuss how Christianity does not just change how a person acts but also how he thinks. |
| 2 | 1B A Christian Approach to Earth Science | 6–12 |  |  Lead students to define *worldview*, and have them explain how it is part of doing science. Stimulate a discussion that contrasts secular and Christian worldviews. Guide students through an analysis of model making as the work of science. Expose students to other views of origins that claim to be biblical. |
| 3 | Lab 1B: Finding the Standard CarrotLab 1C: Insufficient Data |
| 4 | 1C Earth Science in Action | 13–18 |  |  Show how historical science is especially affected by worldview. Inspire students to consider whether God could use them to help people, exercise dominion, and glorify God through a life-long vocation in earth science. |
| 5 | Chapter 1 Review |
| 6 | Chapter 1 Test |
| Chapter 2: Matter, Forces, and Energy |
| 7 | 2A Matter | 23–30 |  |  Highlight the way worldview affects even how people view things like matter, forces, and energy by discussing the Big Bang experiment and dark matter. Expose students to other views of origins that claim to be biblical. |
| 8 | Lab 2A: Measuring Matter |
| 9 | Lab 2B: Cooling Down |
| 10 | 2B Forces and Matter | 30–33 |  |  Discuss with your students how insufficient gravity from visible matter in the universe leads secular scientists to propose the existence of dark matter for the gravitational origin of astronomical structures. |
| 11 | 2C Energy and Matter | 34–38 |  |  Help students think through how the law of conservation of energy relates to Creation and to an orderly universe. |
| 12 | 2D Composition of Matter | 39–44 |  |  |
| 13 | Chapter 2 Review |
| 14 | Chapter 2 Test |
| Chapter 3: Maps and Mapping |
| 15 | 3A Why Do We Use Maps? | 49–58 |  |  Begin your discussion of maps by using the chapter opener on the Ghost Map to show how mapping can be used to help people. Expose students to other views of origins that claim to be biblical. |
| 16 | Lab 3A: Where Am I? |
| 17 | 3B Types of Maps | 58–63 |  |  |
| 18 | Lab 3B: Measuring the Earth |
| 19 | 3C Maps and GIS | 64–68 | \*Lab 3D: What Time Is It? |  Stimulate discussion from students that explores how maps are crucial to exercising dominion on God’s Earth. Highlight dominion opportunities for students to serve God as a cartographer. Explore with students the Life Connection on how GIS and mapping software can help people through disaster relief using the Haitian earthquake in 2010 as an example. |
| 20 | Lab 3C: The Best Vacation |
| 21 | Chapter 3 Review |
| 22 | Chapter 3 Test |
| Unit 2: The Restless Earth |
| Chapter 4: Geology—The Earth Speaks |
| 23 | 4A The Earth, a Special Place | 75–81 |  |  Inspire students to think about Earth as a special place by highlighting the chapter opener on the *Apollo 8* Christmas Eve broadcast. This entire section focuses on evidences for God’s design in our Earth—a place designed for life. Expose students to other views of origins that claim to be biblical. |
| 24 | Lab 4A: Catching Some Rays |
| 25 | 4B Geology, the Science | 81–84 |  |  Help students analyze and contrast both secular and creationary geology and the assumptions of each. |
| 26 | 4C The Earth’s Structure | 85–87 | \*Lab 4B: Listening to the Earth |  Point out that even something as basic as theories for the source of the earth’s magnetic field depend on one’s presuppositions. |
| 27 | 4D The Earth’s Natural Resources | 88–91 |  |  Conduct the discussion of Earth’s resources in the context of God’s provision for man and his responsibility to wisely manage resources. |
| 28 | Chapter 4 Review |
| 29 | Chapter 4 Test |
| Chapter 5: The Changing Earth |
| 30 | 5A Origin of the Earth | 95–99 |  |  This is the key worldview chapter for Unit 2. Begin with a sweeping survey of both secular and creationary views of the earth’s history by introducing the mystery of the wooly mammoths of Siberia. Be sure to point out the worldview cartoon in this section. Expose students to other views of origins that claim to be biblical. Help students analyze and contrast both secular and creationary views of the earth’s formation. |
| 31–32 | 5B A History of Change | 100–112 | \*Lab 5A: Where Do Those Dates Come From? |  Help students analyze and contrast both secular and creationary views of how the earth changed after its formation. Emphasize the biblical chronologies of the pre-Flood period and the timeline of the Flood itself. Students may not be familiar with these concepts, and they are essential to inferring a young earth from Scripture. |
| 33 | Lab 5B: What’s Your Lifespan? |
| 34 | 5C Tectonics: An Agent of Change | 113–119 |  |  Help students analyze and contrast both secular and creationary views of how tectonic forces could have shaped Earth’s surface. Inspire students to consider a career in geology by featuring a modern Christian geologist, John Baumgardner. |
| 35 | Lab 5C: Going with the Flow |
| 36 | Chapter 5 Review |
| 37 | Chapter 5 Test |
| Chapter 6: Earthquakes |
| 38 | 6A Tectonic Forces | 123–126 |  |  Explore how using seismometers and studying earth waves can help people to issue earthquake warnings. Expose students to other views of origins that claim to be biblical. |
| 39 | Lab 6A: Quake Watcher |
| 40 | 6B Faults and Joints | 126–130 |  |  |
| 41 | 6C Earth Waves and Seismology | 130–133 | \*Lab 6B: Where Did It Start? |  Highlight dominion opportunities for students to serve God as a seismologist. In the facet, “The Overthrust Controversy,” students grapple with reversed strata that contradict old-earth geology presuppositions. |
| 42 | 6D Effects of Earthquakes | 135–141 | \*Lab 6C: All Quiet? |  Conduct a discussion about why Christians should be interested in helping underdeveloped countries build enough economic wealth to help reduce the risks of earthquake hazards. |
| 43 | Chapter 6 Review |
| 44 | Chapter 6 Test |
| Chapter 7: Mountains and Hills |
| 45 | 7A: What Is a Mountain? | 145–150 |  |  |
| 46 | Lab 7A: How High? |
| 47 | Lab 7B: Mapping a Modeled Mountain |
| 48 | 7B: Tectonic Mountains | 150–156 |  |  |
| 49 | 7C: Non-Tectonic Hills and Mountains | 156–161 | \*Lab 7C: Staying on Top of It |  Have students compare and contrast the secular view of mountains with the young-earth view. Be sure to point out the worldview cartoon on page 159. |
| 50 | Chapter 7 Review |
| 51 | Chapter 7 Test |
| Chapter 8: Volcanoes and Volcanism |
| 52 | 8A: Fire Mountains | 167–174 | \*Lab 8A: Hot Spots |  Begin the chapter by stimulating students to consider studying volcanoes as a way to exercise dominion and help other people. Encourage students to think of volcanoes, flood basalts, and the pervasiveness of both in the world from the perspective of the Flood and its devastating effects. |
| 53 | 8B: Classifying Volcanoes | 175–180 | \*Lab 8B: Volcanic Visits |  Keep careers in front of students by highlighting the career box on volcanologists and their dominion opportunities. |
| 54 | 8C: Intrusive Volcanism | 180–187 |  |  Help students consider the potential and economic risks of geothermal energy as a renewable energy source in the context of exercising dominion. |
| 55 | Chapter 8 Review |
| 56 | Chapter 8 Test |
| Unit 3: Earth’s Rocky Materials |
| Chapter 9: Minerals and Ores |
| 57 | 9A Describing Minerals | 193–195 |  |  Present this chapter on minerals as a demonstration of the opportunity to exercise dominion over God’s earth by maximizing its usefulness. |
| 58 | 9B Identifying Minerals | 195–202 |  |  |
| 59 | Lab 9A: Crafting a Crystal |
| 60 | Lab 9B: Unmasking Mysterious Minerals |
| 61 | 9C Minerals as Resources | 203–211 |  |  End this chapter by highlighting positive and negative aspects of using minerals to exercise dominion. |
| 62 | Chapter 9 Review |
| 63 | Chapter 9 Test |
| Chapter 10: Rocks |
| 64 | 10A Classifying Rocks | 215–217 |  |  Place this chapter into the context of the clash of old- and young-earth views of rocks and their origins. |
| 65 | 10B Igneous Rocks | 217–221 |  |  Encourage students to deduce the maximum age of most igneous features in view of a global, catastrophic flood. |
| 66 | 10C Sedimentary Rocks | 221–227 |  |  Keep science careers and their opportunities for dominion before students with the career box, “Serving God as a Sedimentologist.” |
| 67 | 10D Metamorphic Rocks | 228–232 |  |  Discuss the formation of certain kinds of rocks as a possible result of the Flood in the facet, “Hydrothermal Fluids.” |
| 68 | Lab 10A: Rock-Solid Science |
| 69 | 10E The “Rock Cycle” | 232–234 | \*Lab 10B: Geological Speed Bumps |  Help students contrast old- and young-earth views of the rock cycle, emphasized by the worldview cartoon on page 233. |
| 70 | Chapter 10 Review |
| 71 | Chapter 10 Test |
| Chapter 11: Fossils |
| 72 | 11A Fossilization | 239–246 | \*Lab 11A: How Old Is It? |  This key worldview chapter for Unit 3 is a contrast of worldviews. Set the stage by featuring the opener on the La Brea Tar Pits of Los Angeles. Expose students to the reasoning behind dating fossils in rocks and dating rocks in which similar fossils are found. |
| 73 | 11B Paleontology | 246–253 | \*Lab 11B:Trilobite-ology |  Arouse students’ interest by discussing dinosaurs and the old- and young-earth views of where they came from and how they disappeared. Put the pressure on. Confront students with the question on page 251, which forces them to deal with the Bible’s inerrancy in the face of conflicting science. |
| 74 | 11C Fossil Fuels | 254–262 |  |  Students likely have never heard of alternative views for the origin of oil and natural gas. Analyze these views. Discuss them with your students. |
| 75 | Chapter 11 Review |
| 76 | Chapter 11 Test |
| Chapter 12: Weathering, Erosion, and Soils |
| 77 | 12A Weathering | 267–270 |  |  |
| 78 | Lab 12A: All Worn Out |
| 79 | 12B Erosion and Deposition | 270–281 | \*Lab 12B: Glacier Trek |  Get students to think of managing erosion in the context of dominion. Trigger some creative thought by asking the question on page 275, which relates Creation, the Fall, and erosion. The box at the bottom of page 278 gets students to begin thinking about climate change. We will continue this line of thought in Chapter 21 in the context of a Christian worldview. |
| 80 | 12C Soil | 282–288 |  |  Discuss soil as a God-given resource that needs to be conserved and used wisely. Continue this discussion by featuring the career box on “Serving God as a Pedologist.” |
| 81 | Lab 12C: Getting Muddy |
| 82 | Chapter 12 Review |
| 83 | Chapter 12 Test |
| Unit 4: The Water World |
| Chapter 13: Oceans and Seas |
| 84 | 13A Ocean Basins | 295–305 |  |  Start the unit on Earth’s water by discussing how our greatest need for water is for drinking. Begin whetting students’ appetites for a discussion of environmentalism in Chapter 21 by discussing the life connection on coral reefs and man’s responsibility to care for God’s world. |
| 85 | 13B Seawater | 306–312 |  |  Help students tackle the question of where seawater came from, how it has changed, and how animals adapted to these changes within a Christian worldview of Earth’s history. |
| 86 | Lab 13A: Too Salty? |
| 87 | Lab 13B: Low Salt |
| 88 | 13C Ocean Environments | 312–317 |  |  End the chapter by helping students see how the oceans are part of God’s design and provision for a life-filled earth. |
| 89 | Chapter 13 Review |
| 90 | Chapter 13 Test |
| Chapter 14: Ocean Motions |
| 91 | 14A Tides | 321–327 |  |  Set the stage for this chapter on ocean motion by having students suggest ways we can use oceans. Discuss the Great Pacific Garbage Patch as an example of how we have misused the oceans. |
| 92 | 14B Currents | 327–335 |  |  |
| 93 | Lab 14A: Current Events |
| 94 | 14C Waves | 335–342 |  |  Beach conservation is another aspect of managing God’s world. Have your students research how beach erosion can be controlled. |
| 95 | Lab 14B: Making Waves |
| 96 | Chapter 14 Review |
| 97 | Chapter 14 Test |
| Chapter 15: Ocean Exploration |
| 98 | 15A The History of Ocean Exploration | 347–351 |  |  Get your students excited about studying the oceans. Expose them to the mysteries, hazards, and potential for dominion in ocean exploration. Continue the discussion by featuring the career box on oceanographers on page 347. |
| 99 | 15B Oceanography in Action | 352–359 | \*Lab 15A: Taking a Bath |  |
| 100 | 15C Entering an Alien World | 359–369 |  |  Your students may enjoy a spirited discussion of the benefits and hazards of manned ocean exploration, which are covered on page 365. |
| 101 | Lab 15B: Dive, Dive! |
| 102 | Chapter 15 Review |
| 103 | Chapter 15 Test |
| Chapter 16: Surface Waters |
| 104 | 16A Streams | 373–380 |  |  Begin this chapter on surface waters by telling the story of the Three Gorges Dam. Use this to open up the study of surface waters in the context of exercising wise dominion. |
| 105 | 16B Lakes and Ponds | 381–390 | \*Lab 16A: Surface Impressions |  Discuss the origin and age of lakes within a Flood-geology framework. |
| 106 | Lab 16B: Being *Too* Green? |
| 107 | Chapter 16 Review |
| 108 | Chapter 16 Test |
| Chapter 17: Groundwater |
| 109 | 17A Underground Reservoirs | 395–401 |  |  This is the key worldview chapter for Unit 4. Put this chapter in perspective by helping students see how precious groundwater is and how important it is to use it carefully. Help them see God’s provision for life on Earth. |
| 110 | Lab 17A: Perking *Down* |
| 111 | 17B Groundwater Chemistry | 402–404 |  |  Expose students to the properties of water that make it unique, God’s special design. |
| 112 | Lab 17B: Taking the Waters |
| 113 | 17C Water as a Resource | 404–408 |  |  Lead a student discussion from a Christian worldview on how water can be used and why it should be conserved. |
| 114 | 17D Groundwater Landforms | 408–418 |  |  Get students to see solution caves as likely consequences of the biblical Flood. When they visit large caves, they should think, “Flood!” Keep opportunities before students to obey the Creation Mandate with earth science by featuring the career box on speleologists. |
| 115 | Chapter 17 Review |
| 116 | Chapter 17 Test |
| Unit 5: The Atmosphere |
| Chapter 18: Earth’s Atmosphere |
| 117 | 18A What Is the Atmosphere? | 425–434 |  |  Get students to care about pollution and the atmosphere by featuring the chapter opener on air pollution. Guide students in contrasting the old- and young-earth stories of the origin of the atmosphere. You may want to discuss the assumptions of the Urey-Miller experiment. You may choose to discuss the Canopy theory with your students in this chapter or in Chapter 21. Continue to expose students to opportunities to serve God in earth science with the biographical box on Larry Vardiman, a modern-day Christian atmosphere scientist. |
| 118 | Lab 18A: Weighty Matters |
| 119 | 18B Special Zones in the Atmosphere | 435–439 |  |  Approach this section with a mind focused on God’s design of the atmosphere and provision for a life-filled earth. Develop some critical thinking in your students by exposing them to what scientists are saying today about the ozone hole. Help them reflect on the nature of valid science and the promises of God’s Word. |
| 120 | 18C Energy in the Atmosphere | 439–442 |  |  |
| 121 | Lab 18B: Warming Up |
| 122 | Chapter 18 Review |
| 123 | Chapter 18 Test |
| Chapter 19: Weather |
| 124 | 19A What Is Weather? | 447–452 |  |  Studying weather is all about dominion, whether it involves putting up wind turbines or predicting the weather. Help your students to see the chapter from this perspective. |
| 125 | 19B Winds | 453–459 |  |  |
| 126 | Lab 19A: On the Wings of the Wind |
| 127 | 19C: Clouds and Precipitation | 460–468 |  |  Remind students that classification, one of the important functions of science, is an essential part of exercising biblical dominion. |
| 128 | Lab 19B: Psyched Out |
| 129 | Chapter 19 Review |
| 130 | Chapter 19 Test |
| Chapter 20: Storms and Weather Prediction |
| 131 | 20A Air Masses and Fronts | 473–478 |  |  |
| 132–3 | 20B Severe Weather | 479–492 | \*Lab 20A: Tornado Chasing |  Approach this section from the perspective of understanding severe weather to prevent loss of life and property and to love my neighbor. |
| 134 | Lab 20B: Hurricane Hunting |
| 135 | 20C Weather Forecasts | 492–496 |  |  Feature the career box on “Serving God as a Research Meteorologist.” |
| 136 | Chapter 20 Review |
| 137 | Chapter 20 Test |
| Chapter 21: Climate and Climate Change |
| 138 | 21A What Is Climate? | 501–506 |  |  This is the key worldview chapter for Unit 5. Begin by discussing environmentalism in relation to biblical dominion. Your students may be quite familiar with the Canopy theory. Take some time to analyze it from a scientific and biblical viewpoint. |
| 139 | 21B Climate Zones | 507–511 |  |  Feature the career box on “Serving God as a Climatologist.” Students need to hear about science careers and how to prepare for them. |
| 140 | 21C Climate Change | 511–522 |  |  This section has the potential to develop important critical thinking skills in students. Expose them to a discussion of climate change from a biblical worldview. |
| 141 | Lab 21A: Too Complex |
| 142-3 | Lab 21B: Models that Mislead |
| 144 | Chapter 21 Review |
| 145 | Chapter 21 Test |
| Unit 6: The Heavens |
| Chapter 22: The Sun, Moon, and Earth System |
| 146 | 22A The Sun | 529–536 |  |  Start the unit on the heavens by discussing how we exercise dominion by using them. |
| 147 | Lab 22A: Time Exposure (see lab instructions for scheduling suggestion) |
| 148 | Lab 22B: The Giant Clock |
| 149 | 22B The Moon | 537–543 |  |  Help your students analyze the secular theories for the origin of the moon. Remind them that the moon began fulfilling its purposes as soon as it was created. |
| 150 | 22C The Sun, Moon, and Earth as a System | 543–553 |  |  Remind your students that without the continual interaction of the sun, moon, and earth as God intended, our lives would be very different. |
| 151 | Lab 22C: Mastering the Moon |
| 152 | Chapter 22 Review |
| 153 | Chapter 22 Test |
| Chapter 23: Our Solar System |
| 154 | 23A Modeling the Solar System | 557–563 |  |  This section helps students grasp how modeling is used in science and how that makes science different from the Bible. Science is about workability, but the Bible establishes what is true. |
| 155 | Lab 23A: Being a Galileo (see lab instructions for scheduling suggestion) |
| 156 | Lab 23B: Elliptical Excursions |
| 157 | Lab 23C: Running Backward  |
| 158 | 23B The Planets | 563–574 |  |  Be sure to feature the career box on “Serving God as an Astrogeologist.” |
| 159 | 23C Nonplanetary Objects | 574–580 |  |  |
| 160 | Chapter 23 Review |
| 161 | Chapter 23 Test |
| Chapter 24: Stars, Galaxies, and the Universe |
| 162–3 | 24A Stars | 585–597 |  |  This is the key worldview chapter for Unit 6. Help students get the perspective of their place in the universe by discussing the opener on the Hubble Space Telescope. We human beings may be seemingly insignificant, but we are important to God. |
| 164 | Lab 24A: Sky Map |
| 165 | Lab 24B: Going the Distance |
| 166 | 24B Gas to Galaxies | 597–603 |  |  Draw students’ attention to the facet on Danny Faulkner, a rare breed as a Christian astronomer. |
| 167 | 24C The Universe | 603–613 |  |  Help students tackle secular cosmology and the questions about the universe that still need answers. Bolster their faith in God’s Word in a field that is largely philosophical. The most important part of this section is in the last few paragraphs. Be sure your students are clear about which questions in cosmology can have no definite answers. |
| 168 | Chapter 24 Review |
| 169 | Chapter 24 Test |
| Chapter 25: Space Exploration |
| 170 | 25A Telescopes | 617–622 |  |  “Blast off” this chapter by covering the chapter opener. This helps students get excited about how space exploration helps us to exercise dominion and to love people through technology we use every day. |
| 171 | Lab 25A: Scoping the Skies |
| 172 | 25B Rockets, Satellites, and Probes | 623–632 |  |  Be sure to feature the career box on “Serving God as an Aerospace Engineer.” |
| 173 | Lab 25B: Reaction Time |
| 174 | Lab 25C: Liftoff! |
| 175 | 25C Manned Space Exploration | 632–641 |  |  Conclude this book by conducting a student discussion that deals with the benefits and risks of space exploration, and how the right balance of these helps us exercise dominion and love our neighbor. |
| 176 | Chapter 25 Review |
| 177 | Chapter 25 Test |