**LAB-AIDS CORRELATIONS FOR**

**OKLAHOMA ACADEMIC STANDARDS FOR SCIENCE (OAS-S)**

**HIGH SCHOOL EARTH SCIENCE**

*Mark Koker, Ph D, Director of Curriculum & Professional Development, Lab-Aids*
*Lisa Kelp, Curriculum Specialist, Lab-Aids*

This document shows how the *EDC Earth Science* materials align with the *Oklahoma Academic Standards for Science*[1].

ABOUT OUR PROGRAMS

Lab-Aids has maintained its home offices and operations in Ronkonkoma, NY, since 1963. We publish over 200 kits and core curriculum programs to support science teaching and learning, grades 6-12. All core curricula support an inquiry-driven pedagogy, with support for literacy skill development and with robust support for assessment. All programs have extensive support for technology and feature comprehensive teacher support. For more information please visit www.lab-aids.com and navigate to the program of interest.

ABOUT *EDC EARTH SCIENCE*

*EDC Earth Science* is a full year, activity-driven high school earth science course developed by the Education Development Center (EDC), with support from the National Science Foundation. *EDC Earth Science* is designed around the belief that students are capable of rigorous and in-depth explorations in science when given adequate support, structure, and motivation for learning.

*EDC Earth Science* features the following design components:

- In-depth treatment of content based on recommendations in national standards and representative state frameworks
- Developmentally appropriate lessons featuring Earth Science concepts that build on previous learning and prepare students for more advanced courses
- Using historical, newsworthy, and fictionalized stories to draw students into the earth science content, to motivate them to acquire the knowledge for solving problems, and to serve as a framework around which students build conceptual understanding
- Differentiated instructional strategies and activities that help students construct meaning from their experiences and that serve as bridges between concrete and abstract thinking
- Support for developing literacy skills and the use of formative assessment techniques

[1] https://sde.ok.gov/sites/default/files/Oklahoma%20Academic%20Standards%20for%20Science.pdf

- Each chapter of EDC: Earth Science is a cluster of activities that addresses a specific set of concepts and skills. The amount of class time for each chapter will vary. A chapter may range from one to four weeks of classroom sessions. Not shown here are two project-oriented shorter chapters that open and close the course, which taken together require 2-4 weeks for completion. This provides up to 32 weeks of actual instructional time, plus an additional 4 weeks for assessment and related activities.

| *Unit Title* | *Core Science Content* | *Suggested Time* |
|---|---|---|
| 1 Hydrosphere: Water in Earth's Systems | Water cycle; surface water, groundwater, assessing and protecting water supplies, Global patterns of ocean circulation; how wind and density differences drive ocean currents; global conveyor belt; El Niño | 3-4 weeks |
| 2 Atmosphere and Climate | Climate and weather; influence of latitude, atmospheric circulation, proximity to ocean, elevation, land features, and prevailing winds on regional climate, Energy balance, albedo effect, greenhouse effect, carbon cycle, positive and negative feedback loops; Paleoclimatology, climate proxies, climate change in Earth's past, Milankovitch cycles, tectonic processes that influence climate, human impact on climate | 5-8 weeks |
| 3 Earth's Place in the Universe | Life and death of stars, solar nebular condensation hypothesis, Kepler's Laws, Earth's interior structure and composition, internal sources of heat energy, seismic waves, introduction to plate tectonic theory, driving forces of plate movement | 3-4 weeks |
| 4 Plate Tectonics | Transform-fault boundaries, earthquakes, physical and computer models Subduction zones, volcanoes, formation of igneous rocks, field-measurement technologies for volcano monitoring seafloor spreading, paleomagnetism, plate tectonics summary, landforms associated with plate boundaries | 5-7 weeks |
| 5 The Rock Cycle | Erosion and deposition, deltaic processes, formation of sedimentary rock, The nature of rocks and minerals, rock cycle | 3-6 weeks |
| 6 Earth's Resources | The geologic processes by which mineral ores are formed; mineral extraction and processing Fossil fuel formation, petroleum resources and exploration technologies | 3-6 weeks |

Each TE chapter provides detailed information on support for core content, practices, and cross cutting concepts. For more information, visit us at www.lab-aids.com.

**ABOUT THE LAB-AIDS CITATIONS**

The following tables are presented in an OAS-S format. Locations in EDC Earth Science that support the OAS-S are identified.

**EARTH'S PLACE IN THE UNIVERSE (ESS1)**

| OKLAHOMA ACADEMIC STANDARD FOR SCIENCE | LOCATION IN EDC Earth Science (Chapter/Activity) |
|---|---|
| **ES.ESS1.1**. Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation. | **8** READING: Life Cycle of Stars* |
| **ES.ESS1.2**. Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. | **8** ACTIVITY 5: Spectroscopy* |
| **ES.ESS1.3**. Construct an explanation about the process that causes stars to produce elements throughout their life cycle. | **8** READING: Life Cycle of Stars; READING Solar Nebula Condensation Theory* |
| **ES**.**ESS1.4** Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. | **8** ACTIVITY 4: Explaining Patterns of Motion with Kepler's Laws of Motion |
| **ES.ESS1.5**. Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. | **11** READING: Could Mt Rainier Erupt?<br>READING: How Do Convergent Boundaries Shape Earth's Surface<br><br>**14** READING: Elements of Earth's Crust |
| **ES.ESS1.6**. Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. | **8** WHAT'S THE STORY: Meteorites: "Scientific Gold"<br>ACTIVITY 1: The Dating Game<br>READING Solar Nebula Condensation Theory |

**EARTH'S SYSTEMS (ESS2)**

| OKLAHOMA ACADEMIC STANDARD FOR SCIENCE | LOCATION IN EDC Earth Science (Chapter/Activity) |
|---|---|
| **ES.ESS2.1.** Develop a model to illustrate how Earth's internal and surface processes operate at different scales of space and time to form continental and ocean-floor features. | **11** READING**:** How do Convergent Boundaries Shape Earth's Surface Features?<br><br>**12** ACTIVITY 1: Using Sound Waves to Help Map the Ocean Floor<br>ACTIVITY 2: Studying Maps of Earth's Oceans<br>ACTIVITY 4: How Are Ocean Basins Formed by Seafloor Spreading?<br><br>**13** READING: How Do Rivers Build Land? |
| **ES.ESS2.2**. Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. | **5** READING: The Greenhouse Effect, the Albedo Effect, the Carbon Cycle and Feedback Loops<br>**6** ACTIVITY 4: What's Happening Now and What's Projected for the Future?<br>READING: Sorting Out Natural and Human-Induced Climate Change |

| OKLAHOMA ACADEMIC STANDARD FOR SCIENCE | LOCATION IN EDC Earth Science (Chapter/Activity) |
|---|---|
| **ES.ESS2.3**. Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. | 9 READING: A Dense Interior<br>ACTIVITY 1: Modeling Earth's Interior Structure<br>READING: Energy in Earths Interior |
| **ES.ESS2.4.** Analyze and interpret data to explore how variations in the flow of energy into and out of Earth's systems causes changes to<br>the atmosphere and climate. | **5** READING: The Greenhouse Effect, the Albedo Effect, the Carbon Cycle and Feedback Loops<br><br>**6** ACTIVITY 3: Investigating How Orbital Changes Have Affected Past Climate<br>READING: The Carbon Cycle, Cretaceous Breadfruit Trees, and the Long Slide to the Ice Age<br>READING: Sorting Out Natural and Human-Induced Climate Change |
| **ES.ESS2.5.** Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. | **2** ACTIVITY 1: Reservoir Roulette: A Journey Through the Water Cycle<br>READING: The Unique Qualities of Water<br>**13** ACTIVITY 1: Modeling River Deposits<br>ACTIVITY 2: Modeling a River Delta<br>READING: How Do Rivers Build Land? |
| **ES.ESS2.6**. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. | **5** ACTIVITY 3: Moving Carbon Around<br>ACTIVITY 4: Calling All Carbons<br>READING: The Greenhouse Effect, the Albedo Effect, the Carbon Cycle and Feedback Loops |
| **ES.ESS2.7.** Engage in argument from evidence for how the simultaneous co-evolution of Earth's systems and life on Earth led to periods<br>of stability and change over geologic time. | Not well developed |

**EARTH AND HUMAN ACTIVITY (ESS3)**

| OKLAHOMA ACADEMIC STANDARD FOR SCIENCE | LOCATION IN EDC Earth Science (Chapter/Activity) |
|---|---|
| **ES.ESS3.1.** Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate affect human activity. | **2** ACTIVITY 2: Where's the Drinking Water?<br>READING: Capturing the Good Water<br>**10** ACTIVITY 3: What is Happening Along the San Andreas Fault?<br>**11** READING: Could Mt Rainier Erupt?<br>ACTIVITY 3: What Might an Eruption of Rainier Be Like?<br>**13** READING: Have People Played A Role in the Subsidence of New Orleans? |
| **ES.ESS3.2.** Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios on large and small scales. | **15** ACTIVITY 1: Where Are the Mineral Ores?<br>**15** READING: The Recipe for Oil (supports) |
| **ES.ESS3.5**. Construct a scientific explanation from evidence for how geological processes cause uneven distribution of natural<br>resources. | **14** ACTIVITY 3 Clues in Rock-Forming Processes<br>**15** ACTIVITY 1 Where are the Mineral Ores?<br>ACTIVIT 2 Prospecting for Mineral Ores.<br>READING Ore from Earth |