Lab-Aids Correlations for

ARIZONA SCIENCE STANDARDS

HIGH SCHOOL LEVEL, EARTH SCIENCE[1]

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This document is intended to show the alignment of Science and Global Issues: Biology with the Arizona Science Standards.

ABOUT OUR PROGRAMS

Lab-Aids Core Science Programs are developed to support current knowledge on the teaching and learning of science. All materials support an inquiry-driven pedagogy, with support for literacy skill development and with assessment programs that clearly show what students know and are able to do from using the programs. All programs have extensive support for technology in the school science classrooms and feature comprehensive teacher support.

ABOUT EDC EARTH SCIENCE

EDC Earth Science is a full year, activity-driven high school earth science course developed by the Oceans of Data Institute3 at the Education Development Center (EDC), with support from the National Science Foundation, and is fully aligned to the *Next Generation Science Framework*. *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;
- The use of 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; and,
- Support for developing literacy skills and the use of formative assessment techniques.

Each chapter of *EDC Earth Science* is a cluster of activities that addresses a specific set of concepts andskills. The amount of class time for each chapter will vary. A chapter may range from one to four

[1] Adopted by the Arizona Department of Education, October 22, 2018

weeks of classroom sessions. Not shown in the following table 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. For more information, visit https://store.lab-aids.com/high-school-curriculum/edc-earth-science.

UNIT TITLE	CORE SCIENCE CONTENT	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, paleo-magnetism, 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

AZ EARTH SCIENCE STANDARD	WHERE FOUND IN EDC EARTH SCIENCE
Essential HS.E1U1.11 **Analyze and interpret data** to determine how energy from the Sun affects weather patterns and climate.	Unit 2: Chapters 4-5 (see TE pp 109 and 150-151)
Plus HS+E.E1U1.1 **Construct an explanation** based on evidence for how the Sun's energy transfers between Earth's systems.	Unit 2: Chapters 4-5 (see TE pp 109 and 150-151)
Plus HS+E.E1U1.2 **Develop and use a model** to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate	Unit 2: Chapters 5-6 (see TE pp 150-151, 190)
Plus HS+E.E1U1.3 Analyze geoscience data and the results from global climate models to make evidence-based predictions of the current rate and scale of global or regional climate changes. (ASTA recommended edit)	Unit 2: Chapters 5-6 (see TE pp 150-151, 190)
HS.E1U1.12 **Develop and use a model** of the Earth that explains the role of energy and matter in Earth's constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere).	Unit 4, Chapters 10-12 (TE pp 331, 376, 430-431) Unit 2: Chapters 4-6 (see TE pp 109, 150-151, 190) Unit 1: Chapters 2-3 (TE 21, 68)
Plus HS+E.E1U1.3 **Analyze and interpret** geoscience **data** to make the claim that dynamic interactions with Earth's surface can create feedbacks that cause changes to other Earth systems.	Unit 2: Chapter 6 (TE 190) Unit 4, Chapters 10-12 (TE pp 331, 376, 430-431)
Plus HS+E.E1U1.4 **Obtain, evaluate and communicate information** on the effect of water on Earth's materials, surface processes, and groundwater systems.	Unit 1: Chapter 2-3 (TE 21, 68)
Essential HS.E1U1.13 **Evaluate** explanations and theories about the role of energy and matter in geologic changes over time.	Unit 3: Chapter 9 (TE 290-291) Unit 4: Chapter 10 (TE 331)
Plus HS+E.E1U1.5 **Obtain, evaluate, and communicate** evidence of the theory of plate tectonics to explain the differences in age, structure, and composition of Earth's crust.	Unit 3: Chapter 9 (TE 290-291) Unit 4: Chapter 10 (TE 331)
Plus HS+E.E1U1.6 **Engage in argument from evidence** of ancient Earth materials, meteorites, and other planetary surfaces to explain Earth's formation and early history.	Unit 3: Chapter 9 (TE 290-291)

AZ EARTH SCIENCE STANDARD	WHERE FOUND IN EDC EARTH SCIENCE
Plus HS+E.E1U1.7 **Develop and use a model** to illustrate how Earth's internal and surface processes operate over time to form, modify, and recycle continental and ocean floor features.	Unit 2: Chapter 4 (TE109)
Essential HS.E1U3.14 **Engage in argument from evidence** about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other.	Unit 6: Chapter 15, 16 (TE 569 and 606)
Plus HS+E.E1U3.11 Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. (ASTA recommended edit)	Unit 6: Chapter 15, 16 (TE 569 and 606)
Plus HS+E.E1U3.12 Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.(ASTA recommended edit)	See, for example, end of chapter process problems for Chapters 1 (design a settlement on Mars), 5 (Alaskan village threatened by climate change), 9 (robotic vehicle for deep Earth exploration), 10 (earthquake preparation), 13 (subsidence on the Mississippi delta), 15 (environmental impacts of mineral development)
Plus HS+E.E1U3.13 Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity. (ASTA recommended edit)	Unit 1: Chapter 2 (TE 21) Unit 6: Chapters 15, 16 (TE 569 and 606)
Essential HS.E2U1.15 **Construct an explanation** based on evidence to illustrate the role of nuclear fusion in the life cycle of a star.	Unit 3: Chapter 8 (TE 253)
Plus HS+E.E2U1.8 **Obtain, evaluate, and communicate** scientific **information** about the way stars, throughout their stellar stages, produce elements and energy.	Unit 3: Chapter 8 (TE 253)
Essential HS.E2U1.16 **Construct an explanation** of how gravitational forces impact the evolution of planetary motion, structure, surfaces, atmospheres, moons, and rings.	Unit 3: Chapter 8 (TE 253)

AZ EARTH SCIENCE STANDARD	WHERE FOUND IN EDC EARTH SCIENCE
Plus HS+E.E2U1.9 **Analyze and interpret data** showing how gravitational forces are influenced by mass, and the distance between objects	Unit 3: Chapter 8 (TE 253)
Plus HS+E.E2U1.10 **Use mathematics and computational thinking** to explain the movement of planets and objects in the solar system.	Unit 3: Chapter 8 (TE 253)
Essential HS.E2U1.17 **Construct an explanation** of the origin, expansion, and scale of the universe based on astronomical evidence.	Unit 3: Chapter 8 (TE 253) Emphasis is placed on the formation of the solar system
Plus HS+E.E2U1.11 **Obtain, evaluate, and communicate information** on how the nebular theory explains solar system formation with distinct regions characterized by different types of planetary and other bodies.	Unit 3: Chapter 8 (TE 253)
Plus HS+E.E2U1.12 **Obtain, evaluate, and communicate information** about patterns of size and scale of our solar system, our galaxy, and the universe	Unit 3: Chapter 8 (TE 253) Emphasis is placed on the formation of the solar system
Plus HS+E.E2U2.12 **Obtain, evaluate, and communicate** the impact of technology on human understanding of the formation, scale, and composition of the universe	Unit 3: Chapter 8 (TE 253) Emphasis is placed on the formation of the solar system