



Lab-Aids Correlations for

2022 Oregon Science Standards: High School Earth and Space Science

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This document is intended to show how the *EDC Earth Science., Revised Edition* materials align with the [2022 Oregon Science Standards](#).

ABOUT OUR PROGRAMS

Lab-Aids has based 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 assessment programs that clearly show what students know and are able to do as a result of program use. 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.

SEPUP

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ABOUT THE LAB-AIDS CITATION

Citations included in the correlation document are as follows:

Unit number and name	U3: Earth's Place in the Universe
Chapter, page, and Resource Supplement numbers	Ch8: 200-203, 212-215, RS 8

Performance Expectation	HS.ESS1.2 ** This performance expectation integrates traditional science content with engineering through a practice or disciplinary core idea. ^ This performance expectation references a proximal connection to climate change and the disciplinary core ideas: Earth's Systems and Earth and Human Activity.
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Grade 9-12 Oregon Earth and Space Science Performance Expectation	EDC Earth Science Unit, Chapter, and Activity
HS.ESS1 Earth's Place in the Universe	
<p>HS.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. <i>[Clarification Statement: Emphasis is on the energy transfer mechanisms that allow energy from nuclear fusion in the sun's core to reach Earth. Examples of evidence for the model include observations of the masses and lifetimes of other stars, as well as the ways that the sun's radiation varies due to sudden solar flares ("space weather"), the 11-year sunspot cycle, and non-cyclic variations over centuries.] [Assessment Boundary: Assessment does not include details of the atomic and sub-atomic processes involved with the sun's nuclear fusion.]</i></p>	<p>U3: Earth's Place in the Universe Ch8: 200-203, 212-215, RS 8.0</p>
<p>HS.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. <i>[Clarification Statement: Emphasis is on the astronomical evidence of the red shift of light from galaxies as an indication that the universe is currently expanding, the cosmic microwave background as the remnant radiation from the Big Bang, and the observed composition of ordinary matter of the universe, primarily found in stars and interstellar gases (from the spectra of electromagnetic radiation from stars), which matches that predicted by the Big Bang theory (3/4 hydrogen and 1/4 helium).]</i></p>	<p>U3: Earth's Place in the Universe Ch8: 200-206, RS 8.0</p>
<p>HS.ESS1.3 Communicate scientific ideas about the way stars, over their life cycle, produce elements. <i>[Clarification Statement: Emphasis is on the way nucleosynthesis, and therefore the different elements created, varies as a function of the mass of a star and the stage of its lifetime.] [Assessment Boundary: Details of the many different nucleosynthesis pathways for stars of differing masses are not assessed.]</i></p>	<p>U3: Earth's Place in the Universe Ch8: 200-201</p>
<p>HS.ESS1.4 Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. <i>[Clarification Statement: Emphasis is on Newtonian gravitational laws governing orbital motions, which apply to human-made satellites as well as planets and moons.] [Assessment Boundary: Mathematical representations for the gravitational attraction of bodies and Kepler's Laws of orbital motions should not deal with more than two bodies, nor involve calculus.]</i></p>	<p>U3: Earth's Place in the Universe Ch8: 208-209</p>
<p>HS.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. <i>[Clarification Statement: Emphasis is on the ability of plate tectonics to explain the ages of crustal rocks. Examples include evidence of the ages oceanic crust increasing with distance from mid-ocean ridges (a result of plate spreading) and the ages of North American continental crust increasing with distance away from a central ancient core (a result of past plate interactions).]</i></p>	<p>U4: Plate Tectonics Ch10: 256-260 Ch12: 342-347</p> <p>U5: The Rock Cycle 14: 399-401, 415-426</p>
<p>HS.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. <i>[Clarification Statement: Emphasis is on using available evidence within the solar system to reconstruct the early history of Earth, which formed along with the rest of the solar system 4.6 billion years ago. Examples of evidence include the absolute ages of ancient materials (obtained by radiometric dating of meteorites, moon rocks, and Earth's oldest minerals), the sizes and compositions of solar system objects, and the impact cratering record of planetary surfaces.]</i></p>	<p>U3: Earth's Place in the Universe Ch9: 195-199, 203-206</p> <p>U5: The Rock Cycle Ch14: 415-426</p>

Grade 9-12 Oregon Earth and Space Science Performance Expectation	EDC Earth Science Unit, Chapter, and Activity
HS.ESS2 Earth's Systems	
<p>HS.ESS2.1 Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. <i>[Clarification Statement: Emphasis is on how the appearance of land features (such as mountains, valleys, and plateaus) and sea-floor features (such as trenches, ridges, and seamounts) are a result of both constructive forces (such as volcanism, tectonic uplift, and orogeny) and destructive mechanisms (such as weathering, mass wasting, and coastal erosion).]</i> <i>[Assessment Boundary: Assessment does not include memorization of the details of the formation of specific geographic features of Earth's surface.]</i></p>	<p>U3: Earth's Place in the Universe Ch9: 241-244</p> <p>U4: Plate Tectonics Ch10: 250-279 Ch11: 289-322, RS 11.1 Ch12: 336-345, 350-352</p> <p>U5: The Rock Cycle Ch13: 363-389 Ch14: 415-426, RS 14.1</p>
<p>HS.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's systems. <i>[Clarification Statement: Examples should include climate feedbacks, such as how an increase in greenhouse gases causes a rise in global temperatures that melts glacial ice, which reduces the amount of sunlight reflected from Earth's surface, increasing surface temperatures and further reducing the amount of ice. Examples could also be taken from other system interactions, such as how the loss of ground vegetation causes an increase in water runoff and soil erosion; how dammed rivers increase groundwater recharge, decrease sediment transport, and increase coastal erosion; or how the loss of wetlands causes a decrease in local humidity that further reduces the wetland extent.]</i></p>	<p>U1: Hydrosphere: Water in Earth's Systems Ch3: 66-70, 72-76</p> <p>U2: Atmosphere and Climate Ch4: 102-106 Ch5: 115-135, RS 5.0 Ch6: 155-164</p>
<p>HS.ESS2.3 Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. <i>[Clarification Statement: Emphasis is on both a one-dimensional model of Earth, with radial layers determined by density, and a three-dimensional model, which is controlled by mantle convection and the resulting plate tectonics. Examples of evidence include maps of Earth's three-dimensional structure obtained from seismic waves, records of the rate of change of Earth's magnetic field (as constraints on convection in the outer core), and identification of the composition of Earth's layers from high-pressure laboratory experiments.]</i></p>	<p>U3: Earth's Place in the Universe Ch9: 241-244</p> <p>U4: Plate Tectonics Ch11: 317-319 Ch12: 342-352</p>
<p>HS.ESS2.4 Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. <i>[Clarification Statement: Examples of the causes of climate change differ by timescale, over 1-10 years: large volcanic eruption, ocean circulation; 10-100s of years: changes in human activity, ocean circulation, solar output; 10-100s of thousands of years: changes to Earth's orbit and the orientation of its axis; and 10-100s of millions of years: long-term changes in atmospheric composition.]</i> <i>[Assessment Boundary: Assessment of the results of changes in climate is limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.]</i></p>	<p>U1: Hydrosphere: Water in Earth's Systems Ch3: 66-76</p> <p>U2: Atmosphere and Climate Ch4: 94-98 Ch5: 115-123 Ch6: 165-178</p> <p>U3: Earth's Place in the Universe Ch8: RS 8.2</p>

Grade 9-12 Oregon Earth and Space Science Performance Expectation	EDC Earth Science Unit, Chapter, and Activity
<p>HS.ESS2.5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. <i>[Clarification Statement: Emphasis is on mechanical and chemical investigations with water and a variety of solid materials to provide the evidence for connections between the hydrologic cycle and system interactions commonly known as the rock cycle. Examples of mechanical investigations include stream transportation and deposition using a stream table, erosion using variations in soil moisture content, or frost wedging by the expansion of water as it freezes. Examples of chemical investigations include chemical weathering and recrystallization (by testing the solubility of different materials) or melt generation (by examining how water lowers the melting temperature of most solids).]</i></p>	<p>U1: Hydrosphere: Water in Earth's Systems Ch2: 24-35 Ch3: 58-76</p> <p>U2: Atmosphere and Climate Ch4: 99-103 Ch5: 116-124, 133-135 Ch6: 165-175</p>
<p>HS.ESS2.6 Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. <i>[Clarification Statement: Emphasis is on modeling biogeochemical cycles that include the cycling of carbon through the ocean, atmosphere, soil, and biosphere (including humans), providing the foundation for living organisms.]</i></p>	<p>U2: Atmosphere and Climate Ch5: 124-135 Ch6: 160-163</p>
<p>HS.ESS2.7 Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. <i>[Clarification Statement: Emphasis is on the dynamic causes, effects, and feedbacks between the biosphere and Earth's other systems, whereby geoscience factors control the evolution of life, which in turn continuously alters Earth's surface. Examples of include how photosynthetic life altered the atmosphere through the production of oxygen, which in turn increased weathering rates and allowed for the evolution of animal life; how microbial life on land increased the formation of soil, which in turn allowed for the evolution of land plants; or how the evolution of corals created reefs that altered patterns of erosion and deposition along coastlines and provided habitats for the evolution of new life forms.] [Assessment Boundary: Assessment does not include a comprehensive understanding of the mechanisms of how the biosphere interacts with all of Earth's other systems.]</i></p>	<p>U1: Hydrosphere: Water in Earth's Systems Ch2: 36-40</p> <p>U2: Atmosphere and Climate Ch5: 127-135, RS 5.1 Ch6: 160-163</p> <p>U3: Earth's Place in the Universe Ch8: RS 8.1</p> <p>U5: The Rock Cycle Ch13: 387-389 Ch14: 425-426</p> <p>U6: Earth Resources Ch15: 447-453 Ch16: 479-485</p>
<p>HS.ESS3 Earth and Human Activity</p>	
<p>HS.ESS3.1 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. <i>[Clarification Statement: Examples of key natural resources include access to fresh water (such as rivers, lakes, and groundwater), regions of fertile soils such as river deltas, and high concentrations of minerals and fossil fuels. Examples of natural hazards can be from interior processes (such as volcanic eruptions and earthquakes), surface processes (such as tsunamis, mass wasting and soil erosion), and severe weather (such as hurricanes, floods, and droughts). Examples of the results of changes in climate that can affect populations or drive mass migrations include changes to sea level, regional patterns of temperature and precipitation, and the types of crops and livestock that can be raised.]</i></p>	<p>U1: Hydrosphere: Water in Earth's Systems Ch2: 18-20, 38-40</p> <p>U4: Plate Tectonics Ch10: 250-253, 283-284 Ch11: 290-292, 321-322</p> <p>U5: The Rock Cycle Ch13: 358-361, 387-389, RS 13.1</p> <p>U6: Earth Resources Ch15: 432-435, 444-456 Ch16: 461-468, 479-485</p>

Grade 9-12 Oregon Earth and Space Science Performance Expectation	EDC Earth Science Unit, Chapter, and Activity
<p>HS.ESS3.2 Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.** <i>[Clarification Statement: Emphasis is on the conservation, recycling, and reuse of resources (such as minerals and metals) where possible, and on minimizing impacts where it is not. Examples include developing best practices for agricultural soil use, mining (for coal, tar sands, and oil shales), and pumping (for petroleum and natural gas). Science knowledge indicates what can happen in natural systems—not what should happen.]</i></p>	<p>U6: Earth Resources Ch16: 482-484, RS 16.1</p>
<p>HS.ESS3.3 Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. <i>[Clarification Statement: Examples of factors that affect the management of natural resources include costs of resource extraction and waste management, per-capita consumption, and the development of new technologies. Examples of factors that affect human sustainability include agricultural efficiency, levels of conservation, and urban planning.]</i> <i>[Assessment Boundary: Assessment for computational simulations is limited to using provided multi-parameter programs or constructing simplified spreadsheet calculations.]</i></p>	<p>U1: Hydrosphere: Water in Earth’s Systems Ch2: 18-23</p> <p>U2: Atmosphere and Climate Ch5: 127-132 Ch6: 165-178</p> <p>U6: Earth Resources Ch16: 463-467</p>
<p>HS.ESS3.4 Evaluate or refine a technological solution that reduces impacts of human activities on climate change and other natural systems.** <i>[Clarification Statement: Examples of data on the impacts of human activities could include the quantities and types of pollutants released, changes to biomass and species diversity, or areal changes in land surface use (such as for urban development, agriculture and livestock, or surface mining). Examples for limiting future impacts could range from local efforts (such as reducing, reusing, and recycling resources) to large-scale geoenvironmental design solutions (such as altering global temperatures by making large changes to the atmosphere or ocean).]</i></p>	<p>U1: Hydrosphere: Water in Earth’s Systems Ch2: 38-40</p> <p>U5: Rock Cycle Ch13: 387-389</p> <p>U6: Earth Resources Ch15: 447-453, RS 15.2 Ch16: 479-481</p>
<p>HS.ESS3.5 Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. <i>[Clarification Statement: Examples of evidence, for both data and climate model outputs, are for climate changes (such as precipitation and temperature) and their associated impacts (such as on sea level, glacial ice volumes, or atmosphere and ocean composition).]</i> <i>[Assessment Boundary: Assessment is limited to one example of climate change and its associated impacts.]</i></p>	<p>U2: Atmosphere and Climate Ch6: 165-178</p>
<p>HS.ESS3.6 Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity (i.e., climate change). <i>[Clarification Statement: Examples of Earth systems to be considered are the hydrosphere, atmosphere, cryosphere, geosphere, and/or biosphere. An example of the far-reaching impacts from human activity is how an increase in atmospheric carbon dioxide results in an increase in photosynthetic biomass on land and an increase in ocean acidification, with resulting impacts on sea organism health and marine populations.]</i> <i>[Assessment Boundary: Assessment does not include running computational representations but is limited to using the published results of scientific computational models.]</i></p>	<p>U2: Atmosphere and Climate Ch5: 127-135 Ch6: 165-175</p>