

ADVENTIST EDUCATION STANDARDS

Standards, what learners should know (content) and be able to do (skills), serve as the framework for curriculum development. Standards in NAD Seventh-day Adventist schools reflect the Adventist worldview across the K-12 curricula as well as the integration of national and provincial/state standards. The Adventist worldview accepts the Bible as the standard by which everything else is measured. Four key concepts emerge from a biblical worldview that can be used as a lens for curriculum development, as well as informing the essential questions and big ideas of any content area: Creation (What is God's intention?), Fall (How has God's purpose been distorted?), Redemption (How does God help us to respond?), and Re-creation (How can we be restored in the image of God?).

— THE CORE OF ADVENTIST EDUCATION CURRICULUM

SCIENCE AND ENGINEERING PRACTICES

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

— NEXT GENERATION SCIENCE STANDARDS

STANDARDS CODING

The standards have been coded so that educators can easily refer to them in their curriculum, instruction, and assessment practices. The coding system that precedes each standard begins with the content area abbreviation in letters; all are identified with S—Science (S.K-2.LS.1). The second part of the code refers to the grade level (S.K-2.LS.1). The third part of the code refers to the particular science domain (S.K-2.LS.1), with LS standing for Life Sciences. The fourth part of the code refers to a particular skill within the science domain (S.K-2.LS.1). The coding system that follows each standard is the Next Generation Science Standards (NGSS) that aligns with the NAD standard. Where no NGSS is noted, there is no corresponding NGSS.

PERFORMANCE-BASED STANDARDS

The science standards are performance-based outcomes (what students should be able to do) rather than content-based outcomes (what students should know). The content standards are implied within the context of the performance standards.

CREDITS

The following resources were referenced in developing Science Standards for Seventh-day Adventist Schools: a sampling of state standards, NAD Curriculum Guide for Science, Next Generation Science Standards (NGSS), National Health Education Standards (NHES), and the Core of Adventist Education Curriculum.

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EARTH AND SPACE SCIENCES

GRADE	TOPICS	STANDARDS (NGSS ALIGNMENT)	BY DESIGN CHAPTER CORRELATION
<p>Essential Question: How do the structure and physical phenomena of Earth and space provide evidence of God as Designer, Creator, and Sustainer of the universe?</p>		<p>Big Idea: The structure and processes of Earth and space are organized and governed by natural laws that give evidence of God as Designer, Creator, and Sustainer.</p>	<p>Bold = included content <i>Italic =</i> related content</p>
K-2	Earth's Systems	S.K-2.ES.1 Use and share observations of local weather conditions to describe patterns over time. (K-ESS2-1)	Level 1 – Ch. 7.1, 7.2 Level 2 – Ch. 7.1, 7.2
		S.K-2.ES.2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. (K-ESS2-2)	Level 1 – Ch. 3.1 Level 2 – Ch. 2.1
		S.K-2.ES.3 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. (2-ESS2-1)	Level 2 – Ch. 6.3, Ch. 7.2
		S.K-2.ES.4 Develop a model to represent the shapes and kinds of land and bodies of water in an area. (2-ESS2-2)	Level 1 – Ch. 8.2 Level 2 – Ch. 6.1, 6.3
		S.K-2.ES.5 Obtain information to identify where water is found on Earth and that it can be solid or liquid. (2-ESS2-3)	Level 1 – Ch. 7.2 Level 2 – Ch. 6.1, 7.2
	Earth and Human Activity	S.K-2.ES.6 Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live. (K-ESS3-2)	Level 1 – Ch. 3.1, 3.2, 3.3 Level 2 – Ch. 1.1, 1.4, Ch. 2.2, 2.3
		S.K-2.ES.7 Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather. (K-ESS3-2)	Level 1 – Ch. 7.1 Level 2 – Ch. 7.1
		S.K-2.ES.8 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment. (K-ESS3-3)	Level 1 – Ch. 3.3 Level 2 – Ch. 2.3
	Earth's Place in the Universe	S.K-2.ES.9 Use observations of the sun, moon, and stars to describe patterns (e.g., sun and moon appear to track across the sky, stars visible at night) that can be predicted. (1-ESS1-1)	Level 1 – Ch. 8.1 Level 2 – Ch. 8.1, 8.2, 8.3
		S.K-2.ES.10 Make observations at different times of year to relate the amount of daylight to the time of year. (1-ESS1-2)	Level 1 – Ch. 7.3 Level 2 – Ch. 7.3
		S.K-2.ES.11 Use information from several sources to provide evidence that Earth events (e.g., volcanic explosions, earthquakes, rock erosion) can occur quickly or slowly. (2-ESS1-1)	Level 2 – Ch. 6.3
3-5	Earth's Systems	S.3-5.ES.1 Represent data (e.g., average temperature, precipitation, wind direction) in tables and graphical displays to describe typical weather conditions expected during a particular season. (3-ESS2-1)	Level 3 – Ch. 8.1, 8.2, 8.3 Level 5 – Ch. 8.1, 8.3
		S.3-5.ES.2 Obtain and combine information to describe climates in different regions of the world. (3-ESS2-2)	Level 3 – Ch. 8.2, 8.3 Level 5 – Ch. 8.4
		S.3-5.ES.3 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation (e.g., angle of slope in downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing water, cycles of heating and cooling, volume of water flow). (4-ESS2-1)	Level 4 – Ch. 7.3, 7.4
		S.3-5.ES.4 Analyze and interpret data from maps, including topographic maps, to describe patterns of Earth's features. (4-ESS2-2)	Level 3 – Ch. 7.1 Level 4 – Ch. 7.1
		S.3-5.ES.5 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact (e.g., influence of ocean on ecosystems, landform shape, climate; influence of the atmosphere on landforms and ecosystems; influence of mountain ranges on winds and clouds). (5-ESS2-1)	Level 3 – Ch. 7.1, Ch. 8.2 Level 4 – Ch. 7.1, 7.3
		S.3-5.ES.6 Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. (5-ESS2-2)	Level 3 – Ch. 7.1 Level 4 – Ch. 7.1 Level 5 – Ch. 8.2, Ch. 10.1, 10.3
	Earth and Human Activity	S.3-5.ES.7 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard (e.g., barriers to prevent flooding, wind resistant roofs, lightning rods). (3-ESS3-1)	Level 3 – Ch. 8.2 Level 5 – Ch. 8.3
		S.3-5.ES.8 Obtain and combine information to describe that energy and fuels are derived from natural resources (e.g., wind energy, water behind dams, sunlight, fossil fuels, fissile materials) and their uses affect the environment (e.g., loss of habitat due to dams, surface mining, air pollution). (4-ESS3-1)	Level 3 – Ch. 3.4, 3.5 Level 4 – Ch. 3.4, Ch. 8.1, 8.3 Level 5 – Ch. 10.3, 10.4
		S.3-5.ES.9 Generate and compare multiple solutions (e.g., earthquake resistant building, monitoring volcanic activity) to reduce the impacts of natural Earth processes on humans. (4-ESS3-2)	Level 4 – Ch. 7.2, 7.3
		S.3-5.ES.10 Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. (5-ESS3-1)	Level 3 – Ch. 3.5 Level 4 – Ch. 8.3 Level 5 – Ch. 10.2, 10.3, 10.4
	Earth's Place in the Universe	S.3-5.ES.11 Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. (4-ESS1-1)	Level 4 – Ch. 7.1, 7.2, 7.4, Ch. 8.2
		S.3-5.ES.12 Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth. (5-ESS1-1)	Level 4 – Ch. 9.4
		S.3-5.ES.13 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. (5-ESS1-2)	Level 3 – Ch. 8.3, Ch. 9.2, 9.3 Level 4 – Ch. 9.2 Level 5 – Ch. 8.4

EARTH AND SPACE SCIENCES CONTINUED

GRADE	TOPICS	STANDARDS (NGSS ALIGNMENT)	BY DESIGN CHAPTER CORRELATION
6-8	Earth's Systems	S.6-8.E.S.1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. (MS-ESS2-1)	Level 6 – Ch. 7.2, Ch. 8.1, 8.2, 8.3, Ch. 9.1, 9.2, 9.3 Level 8- Ch. 8.1, 8.2, 8.3, Ch. 10.1
		S.6-8.E.S.2 Construct an explanation based on evidence for how geoscience processes (e.g., surface weathering and deposition by movements of water, ice, and wind) have changed Earth's surface at varying time and spatial scales (e.g., slow plate motions, uplift of large mountain ranges, rapid landslides, microscopic geochemical reactions). (MS-ESS2-2)	Level 6 – Ch. 7.2, Ch. 8.1, 8.2, 8.3, Ch. 9.1, 9.2, 9.3 Level 8 – Ch. 10.1
		S.6-8.E.S.3 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. (MS-ESS2-3)	Level 6 – Ch. 8.1, 8.2, 8.3, Ch. 10.1, 10.2 Level 8 – Ch. 10.1, 10.2
		S.6-8.E.S.4 Develop a model (conceptual or physical) to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. (MS-ESS2-4)	Level 8 – Ch. 8.2, 8.3
		S.6-8.E.S.5 Collect data (e.g., weather maps, diagrams, visualizations, laboratory experiments) to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. (MS-ESS2-5)	Level 8 – Ch. 8.1, 8.2, 8.3, 8.4
		S.6-8.E.S.6 Develop and use a model (e.g., diagrams, maps and globes, digital representations) to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. (MS-ESS2-6)	Level 7 – Ch. 8.1, Ch. 9.1, 9.2, 9.3 Level 8 – Ch. 8.3, 8.5
	Earth and Human Activity	S.6-8.E.S.7 Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the results of past and current geoscience processes (e.g., plate tectonics, the Flood). (MS-ESS3-1)	Level 6 – Ch. 7.3, Ch. 8.1, 8.2, 8.3, Ch. 9.3 Level 8 – Ch. 9.3, Ch. 10.1, 10.2, 10.3
		S.6-8.E.S.8 Analyze and interpret data (e.g., locations, magnitudes, frequencies) on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. (MS-ESS3-2)	Level 6 – Ch. 8.3, Level 7 – Ch. 8.2, 8.3 Level 8 – Ch. 10.1
		S.6-8.E.S.9 Apply scientific principles to design a method for monitoring and minimizing a human impact (e.g., water usage, soil usage, pollution) on the environment. (MS-ESS3-3)	Level 8 – Ch. 9.1, 9.2, 9.3, 9.4
		S.6-8.E.S.10 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. (MS-ESS3-4)	Level 6 – Ch. 7.3 Level 8 – Ch. 8.5, Ch. 9.1, 9.2, 9.3, 9.4
		S.6-8.E.S.11 Ask questions to clarify evidence (e.g., tables, graphs, maps of global and regional temperatures, atmospheric levels of gases, rates of human activities) of the factors that have caused the rise in global temperatures over the past century (e.g., fossil fuel combustion, cement production, agricultural activity, change in incoming solar radiation, volcanic activity). (MS-ESS3-5)	Level 6 – Ch. 8.3 Level 8 – Ch. 9.1, 9.2, 9.3, 9.4
	Earth's Place in the Universe	S.6-8.E.S.12 Develop and use a model (physical, graphical, or conceptual) of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. (MS-ESS1-1)	Level 7 – Ch. 9.1, 9.2, 9.3 Level 8 – Ch. 8.5
		S.6-8.E.S.13 Develop and use a model (physical or conceptual) to describe the role of gravity in the motions within galaxies and the solar system. (MS-ESS1-2)	Level 7 – Ch. 8.1, 8.2, Ch. 9.1, 9.2, 9.3, Ch. 10.2
		S.6-8.E.S.14 Analyze and interpret data (e.g., statistical information, drawings and photographs, models) to determine scale properties (e.g., size, surface features, orbital radius) of objects in the solar system. (MS-ESS1-3)	Level 7 – Ch. 8.1, 8.2, Ch. 9.3
		S.6-8.E.S.15 Apply scientific principles to construct an explanation, based on evidence from rock strata, for how the geologic column is used to organize Earth's relative age and geologic history, comparing and contrasting creationist and naturalistic perspectives. (MS-ESS1-4)	Level 6 – Ch. 10.1, 10.2, 10.3 Level 8 – Ch. 1.1, 1.2, Ch. 10.2, 10.3