INDIANA DEPARTMENT *of* EDUCATION

2024 INDIANA CONTENT CONNECTORS

SCIENCE

GRADE 4

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Indiana Content Connectors Context and Purpose

Introduction

The Indiana Content Connectors for Grade 4 Science are the result of a process designed to identify, evaluate, synthesize, and create high-quality learning expectations for Indiana students with significant cognitive disabilities.

The Indiana Department of Education (IDOE) convened stakeholder committees to review proposed revisions to Indiana's Alternative Standards, known as content connectors. The content connectors are designed to measure the knowledge and skills of students with the most significant cognitive disabilities and are assessed with the state's alternate assessment. The content connectors are designed to ensure that all Indiana students in this population are prepared with essential knowledge and skills needed to access employment, enrollment, or enlistment leading to service.

What are the Content Connectors and how should they be used?

The Indiana Content Connectors are designed to help educators, parents, students, and community members understand the necessary content for each grade level, and within each content area domain, to access employment, enrollment, or enlistment leading to service. These content connectors should form the basis for strong core instruction for all students at each grade level and content area. The content connectors identify the minimum academic content or skills to which Indiana students need access in order to be prepared for success after graduation, but they are not an exhaustive list.

While the Indiana Content Connectors establish key expectations for knowledge and skills and should be used as the basis for curriculum, the content connectors by themselves do not constitute a curriculum. It is the responsibility of the local school corporation to select and formally adopt curricular tools, including textbooks and any other supplementary materials, that align with Indiana Content Connectors. Additionally, corporation and school leaders should consider the appropriate instructional sequence of the content connectors as well as the length of time needed to teach each one. Every content connector has a unique place in the continuum of learning, but each content connector will not require the same amount of time and attention. A deep understanding of the vertical articulation of the standards will enable educators to make the best instructional decisions. These content connectors must also be complemented by robust, evidence-based instructional practices to support overall student development. By utilizing strategic and intentional instructional practices, other areas such as STEM and employability skills can be integrated with the content connectors.

Acknowledgments

IDOE appreciates the time, dedication, and expertise offered by Indiana's K-12 general and special educators, higher education professors, representatives from business and industry, families, and other stakeholders who contributed to the development of the Indiana Content Connectors. We wish to specially acknowledge the committee members, as well as participants in the public comment period, who dedicated many hours to the review and evaluation of these content connectors designed to prepare Indiana students for success after graduation.

Grade 4 Science

Standards and content connectors identified as essential for mastery by the end of the grade level are indicated with gray shading and an "E."

Indiana Academic Standards	Content Connectors
Energy	
4-PS3-1: Energy Students who demonstrate understanding can: Use evidence to construct an explanation relating the speed of an object to the energy of that object. (E)	**4-PS3-1a:** Use evidence to construct an explanation that faster objects have more energy than slower objects. (E)
4-PS3-2: Energy Students who demonstrate understanding can: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	**4-PS3-2a:** Make observations to provide evidence that energy can move from place to place (e.g., through moving objects, through electric currents).
	4-PS3-2b: Make observations to provide evidence that energy is present in the form of motion, sound, light, or heat.
4-PS3-3: Energy Students who demonstrate understanding can: Ask questions and predict outcomes about the changes in energy that occur when objects collide. [Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.]	**4-PS3-3a:** Ask questions and use observations to predict the change in energy from one object to another when objects collide.
4-PS3-4: Energy Students who demonstrate understanding can: Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. [Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.] (E)	**4-PS3-4a:** Design and test a device that uses an electric current to move energy from place to place. (E)
	4-PS3-4b: Use evidence to identify that stored energy can be turned into usable energy. (E)

Waves and Their Applications in Technologies for Information Transfer	
4-PS4-1: Waves and Their Applications in Technologies for Information Transfer Students who demonstrate understanding can: Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. [Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.]	**4-PS4-1a:** Use evidence from a model to describe simple movement patterns of waves. **4-PS4-1b:** Use a model of a wave (e.g., diagrams, drawings) to identify amplitude (height of the wave) and wavelength (spacing between wave peaks). [Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.]
4-PS4-2: Waves and Their Applications in Technologies for Information Transfer Students who demonstrate understanding can: Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.	**4-PS4-2a:** Use a model to describe that light can be seen when light reflected from its surface enters the eyes.
4-PS4-3: Waves and Their Applications in Technologies for Information Transfer Students who demonstrate understanding can: Generate and compare multiple solutions that use patterns to transfer information. [Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.]	**4-PS4-3a:** Compare solutions that use patterns to transfer information. [Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.]
From Molecules to Organisms: Structures and Processes	
4-LS1-1: From Molecules to Organisms: Structures and Processes Students who demonstrate understanding can: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior,	**4-LS1-1a:** Use evidence to explain how internal and external structures support the growth, survival, behavior, and reproduction of plants and animals. (E)

and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] (E)	
4-LS1-2: From Molecules to Organisms: Structures and Processes Students who demonstrate understanding can: Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. [Clarification Statement: Emphasis is on systems of information transfer.]	**4-LS1-2a:** Use a model to demonstrate how animals use their sense receptors to respond to their environment.
Earth's Place in the Universe	
4-ESS1-1: Earth's Place in the Universe Students who demonstrate understanding can: Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. [Clarification Statement: Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.]	**4-ESS1-1a:** Use evidence from patterns of rock formations caused by Earth's forces (e.g., wind, water, volcanoes, earthquakes) to identify that the Earth's landscape has changed over time. **4-ESS1-1b:** Use fossil evidence to identify the order in which rock layers were formed.
Earth's Systems	
4-ESS2-1: Earth's Systems Students who demonstrate understanding can: Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. [Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and	**4-ESS2-1a:** Make observations and/or measurements to identify a cause-and-effect relationship between weathering or erosion and Earth's surface. [Clarification Statement: Examples could include angle of slope in downhill movement of water, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, volume of water flow.] (E)

volume of water flow.] (E)	**4-ESS2-1b:** Use data from observations and/or measurements to identify that living things can affect the physical characteristics of their surroundings (e.g. amount of vegetation and rate of erosion). (E)
4-ESS2-2: Earth's Systems Students who demonstrate understanding can: Analyze and interpret data from maps to describe patterns of Earth's features. [Clarification Statement: Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]	**4-ESS2-2a:** Use data from maps to describe patterns of Earth's features (e.g., location of mountain ranges, ocean trenches, earthquakes, volcanoes).
Earth and Human Activity	
4-ESS3-1: Earth and Human Activity Students who demonstrate understanding can: Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.] (E)	**4-ESS3-1a:** Use information to match an energy or fuel humans use to its natural source and identify examples that illustrate how human use of energy resources can affect the environment. (E)
4-ESS3-2: Earth and Human Activity Students who demonstrate understanding can: Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. [Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.] (E)	**4-ESS3-2a:** Identify a solution to lessen the impact of hazards caused by natural events (e.g., earthquakes, tsunamis, hurricanes) on humans. (E)

Engineering Design	
3-5-ETS1-1: Engineering Design Students who demonstrate understanding can: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	**3-5-ETS1-1a:** Identify a solution to a problem based on a specific set of desired features (criteria) and available materials and resources (constraints).
3-5-ETS1-2: Engineering Design Students who demonstrate understanding can: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	**3-5-ETS1-2a:** Compare multiple solutions to a problem by investigating how well each solution works under certain conditions.
	3-5-ETS1-2b: Identify a design improvement to a problem by sharing ideas with peers.
3-5-ETS1-3: Engineering Design Students who demonstrate understanding can: Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	**3-5-ETS1-3a:** Test design solutions to identify aspects of the design that can be modified or improved based on specific limitations.