Crosswalk Between the Connecticut Early Learning and Development Standards (CT ELDS) and the Next Generation Science Standards (NGSS)

Introduction

Science is an avenue for learning about the natural world. Science builds on students' natural curiosity, helps them to learn about the world around them and provides them with tools to investigate and solve problems. Two separate documents include learning standards for children from birth through grade 12 in the discipline of Science in Connecticut: The Connecticut Early Learning and Development Standards for children from birth to age five and the Next Generation Science Standards for students from kindergarten through grade 12. This document is intended to connect these two sets of standards in a meaningful way in order to provide a foundation for a continuum of learning for children across ages and grades.

The Connecticut Early Learning and Development Standards (CT ELDS) were released by the Connecticut Office of Early Childhood in 2013. The CT ELDS include standards across eight areas of learning and development: Cognition, Social and Emotional Development, Physical Development and Health, Language and Literacy, Creative Arts, Mathematics, Social Studies and Science. The CT ELDS were developed to help families, communities and schools work together to support children's early learning and growth.

The Next Generation Science Standards (NGSS) were adopted by the Connecticut State Board of Education in November of 2015. These standards include three distinct dimensions to science learning: science and engineering practices, disciplinary core ideas and crosscutting concepts. NGSS represent an important pedagogical shift in Science education.

Purpose of Crosswalk

This crosswalk documents the alignment between two differently structured documents, addressing science learning within different age groups. While the NGSS were adopted in Connecticut after the release of the CT ELDS, both the NGSS and the Science domain of the CT ELDS drew heavily from the National Research Council's Framework for K-12 Science Education and the documents are highly aligned. This crosswalk may be used as a tool for:

- Aligning curriculum and pedagogy across the ages/grades
- Planning experiences to promote further learning and development for preschool children who are ready to move beyond the skills outlined in the CT ELDS
- Planning support to promote the development of precursor learning and development for children entering kindergarten who have not had sufficient opportunities for learning in the domain of Science
- Communicating about individual children's skills

Structure of the Standards Documents

The NGSS include 3 dimensions of science learning: science and engineering practices, disciplinary core ideas and crosscutting concepts. The NGSS document also includes performance standards for each grade which draw from across these three dimensions. This crosswalk focuses on the standards within the three dimensions of learning as the basis for this alignment document and does not directly address the performance standards.

The CT ELDS Science domain is broken down into five strands, which are further divided into learning progressions that include indicators across the seven age ranges from birth to age five. Strands A and B address scientific practices and the process of engineering. Similar to the Science and Engineering Practices addressed in the NGSS, Strands A and B of the Science CT ELDS are intended to address the processes involved with the acquisition of learning and development outlined elsewhere in the standards (the Disciplinary Core Ideas and Crosscutting Concepts within the NGSS and Strands C through E of the CT ELDS).

Connections to Learning and Development in Other Areas

The NGSS include connections to Common Core State Standards in English Language Arts and Mathematics that support integrated learning experiences addressing multiple areas of learning at the same time. The Science domain of the CT ELDS has clear connections to the development of the Essential Dispositions and to learning in other domains as well. This document includes notes regarding alignment of the progression of skills to other aspects of the CT ELDS. The most common connections are to Cognition and the Essential Dispositions, but occasional strong alignment to other domains (including mathematics, social studies and English language arts) are also noted.

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Connecticut Early Learning and Development Standards (CT ELDS)			Next Generation Science Standards (NGSS)-Kindergarten			Notes about the progression from preschool to kindergarten	Notes about alignment to other aspects of CT ELDS
Strand and Learning Progression	**3 to 4 year Indicator**	**4 to 5 year Indicator**	**Science and Engineering Practices**	**Disciplinary Core Ideas**	**Crosscutting Concepts**		
Strand A: Apply Scientific Practices Questioning and Defining Problems	S.48.1 Ask more detailed questions including the relationship between two things or cause and effect relationships	S.60.1 Define a problem to be solved, including details and limitations to be considered (e.g., "We need to figure out how to reach that shelf, but we aren't allowed to stand on the chairs.")	• Asking Questions and Defining Problems • Planning and carrying out investigations	This practice is applied across all DCI.	**Patterns:** Patterns in the natural and human designed world can be observed and used as evidence. **Cause and effect:** Events have causes that generate observable patterns.	Shift in patterns DCI as a basis for using these practices	Cognition • Strand A (Approaches to Learning) • Strand B (Logic and Reasoning) • Strand C (Choosing and planning, cognitive flexibility) Essential Dispositions
Investigating	S.48.2 Intentionally vary actions in order to observe the effect of these actions on materials	S.60.2 Engage in collaborative investigations to describe phenomena or to explore cause and affect relationships S.60.3 Gather data by drawing, counting or otherwise documenting observations	• Analyzing and interpreting data • Obtaining, evaluating, and communicating information	This practice is applied across all DCI.	**Cause and effect:** Events have causes that generate observable patterns.		Strand B Essential Dispositions Strand C (Choosing and planning, cognitive flexibility)
Using Evidence	S.48.3 Cite examples to support their ideas (e.g., "I think the plant will die because when I forgot to water my plant it died.")	S.60.4 Give evidence from observations or investigations S.60.5 Begin to distinguish evidence from opinion	• Analyzing and interpreting data • Constructing explanations (for science) and designing solutions (for engineering) • Engaging in argument from evidence • Obtaining, evaluating and communicating evidence	This practice is applied across all DCI.	**Patterns:** Patterns in the natural and human designed world can be observed and used as evidence. **Cause and effect:** Events have causes that generate observable patterns.	Mathematics as an emerging tool for gathering and analyzing data	Strand B and choosing and planning and cognitive flexibility Mathematics Strand C: Data and Measurement (data and sorting and classifying) Critical Thinker

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Strand B: Engage in the Process of Engineering Design Cycle	S.48.4 Identify a problem and, with adult assistance design a solution (e.g., device or process) to address that problem	S.60.6 Identify a problem and, with adult assistance, design a solution, test and refine design elements	• Asking questions and defining problems Developing and using models • Analyzing and interpreting data	ETS1: Engineering Design: **ETS1.A: Defining and delimiting engineering problems** -Asking questions, making observations, and gathering information are helpful in thinking about problems. **ETS1.B: Developing Possible solutions** -Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solution to other people. **ETS1.C: Optimizing the Design Solution** -Because there is always more than one possible solution to a problem, it is useful to compare and test designs.	**Structure and Function:** The shape and stability of structures of natural and designed objects are related to their function(s).	K-2 Common Core Connections to ELA and Mathematics Applying scientific practices is critical to the process of engineering	Connections to Mathematics and language and literacy Essential Dispositions

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Strand C: Patterns, process and relationships of living things Unity and Diversity of Life	S.48.5 Compare and contrast basic features of living things (e.g., body parts and their uses) between and across groups	S.60.7 Group and classify living things based upon features, providing evidence to support groupings	• Analyzing and Interpreting Data	**LS1 C: Organization for Matter and Energy Flow in Organisms** -All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.)	**Patterns:** Patterns in the natural and human designed world can be observed and used as evidence.	Children first recognize similarities and differences between living and nonliving things. Children then begin to recognize some patterns across living things and nonliving things. As children move into kindergarten they build upon their experiences to gain an understanding of the basic components and patterns as evidence of what is living.	Cognition • Strand B: Logic and Reasoning
Strand C: Patterns, process and relationships of living things Unity and Diversity of Life	S.48.6 Recognize changes in living things over their lifespan by observing similarities and difference between babies and adults	S.60.8 Demonstrate an understanding of how living things grow and change through predictable stages (e.g., birth, growth, reproduction, death)	• Analyzing and Interpreting Data	**LS1 C: Organization for Matter and Energy Flow in Organisms** -All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.	**Patterns:** Patterns in the natural and human designed world can be observed and used as evidence.	The understanding of how living things grow and change over time is reflected in third grade NGSS. In preschool, children begin to consider that living things grow and change over time. Children's ongoing experiences with family members, animals and other living things can be used to notice that living things change and grow, while non-living things do not.	

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Living things and Their Interactions with the Environment and Each Other	S.48.7 Explore how animals depend upon the environment for food, water and shelter	S.60.9 Provide examples of how animals depend on plants and other animals for food		**LS1 C: Organization for Matter and Energy Flow in Organisms** -All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.	**Patterns:** Patterns in the natural and human designed world can be observed and used as evidence.		Strand B Essential Dispositions:
Strand D: Understand Physical Sciences Energy, Force and Motion	S.48.8 Investigate how objects' speed and direction can be varied	S.60.10 Make predictions and conduct simple experiments to change direction, speed and distance objects move S.60.11 Determine cause and effect of push/pull/collision that make objects, start, stop and change direction	• Planning and carrying out investigations • Constructing explanations (for science) and designing solutions (for engineering)	**PS2.A: Forces and Motion** -Pushes and pull can have different strengths and directions. -Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. **PS2.B: Types of Interactions** -When objects touch or collide, they push on one another and can change motion **PS3.C : Relationship Between Energy and Forces** -A bigger push or pull makes things speed up or slow down more quickly.	**Cause and Effect:** Mechanism and explanation **Energy and matter:** Flows, cycles, and conservation	Does not need to be physical 3-dimensional objects. Granular solids, liquids may also offer opportunities for exploring Note alignment to ETS1.A and Strand B in CT ELDS Manipulating materials, investigating cause and effect and communicating the impact of ones actions in preschool builds to further understanding of whether the evidence supports or refutes specific ideas about causes in K.	Strand B and C cause and effect learning progression in Cognition domain of CT ELDS

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Matter and Its Properties	S.48.9 Compare and contrast attributes of common materials related to their function (e.g., flexibility, transparency, strength)	S.60.12 Evaluate the appropriateness of a material for a given purpose based upon its properties S.60.13 Observe how heating and cooling cause changes to properties of materials (e.g., Ice melts when we bring it inside. Plastic becomes brittle when it is left outside in the cold.)	Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem.	See note on progression from preschool to kindergarten	**Structure and function:** The shape and stability of structures of natural and designed objects are related to their function(s). **Stability and change**	Although matter is not explicitly addressed in kindergarten, using tools and materials to solve problems requires some beginning understanding of matter and its properties. Matter and its properties is introduced again more explicitly in Grade 2.	Stand B of Cognition Essential Dispositions

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Strand E: Features of earth Earth's Features and the Effects of Weather and Water	S.48.10 Observe, record, and note patterns regarding weather and the effects on the immediate environment (e.g., Rain over a period of days causes flooding. Sunny days cause the flower bed to dry out.) S.48.11 Investigate how water interacts with other earth materials (e.g., sand, dirt, pebbles)	S.60.14 Give examples of ways in which weather variables (hot/cold temperatures, amount and intensity of precipitation, wind speed) affect us and/or cause changes to earth's features (e.g., The stream has greater water flow after snow melts.)	Analyzing and Interpreting Data Engaging in Argument from Evidence	**ESS2.D Weather and Climate** −Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. -People measure these conditions to describe and record the weather and to notice patterns over time. **ESS2.E Biogeology** -Plants and animals can change their environment. **ESS3.C Human Impacts on Earth Systems** -Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.	**Systems and System Models:** Systems in the natural and designed world have parts that work together **Patterns:** Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.	This should be embedded throughout the year.	Strand B Essential *Disposition*

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Earth and Human Activity	S.48.12 Investigate how humans use design solutions to adapt natural resources to meet basic needs (e.g., cut trees to build houses, make applesauce out of apples)	S.60.15 Explore how humans' use of natural resources impacts the environment (e.g., If we catch all the salmon, this can no longer be a food source. Cutting down trees can cause erosion.)	Asking questions and defining problems Developing and Using Models Obtaining, evaluating and communicating information	**ESS3.A: Natural Resources** -Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. **ESS3.B: Natural Hazards** -Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events. **ESS3.C: Human Impacts on Earth Systems** -Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. **ETS1.A: Defining and Delimiting an Engineering Problem** -Asking questions, making observations, and gathering information are helpful in thinking about problems. **ETS1.B: Developing Possible Solutions** -Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.	Cause and Effect Systems and Systems Models		Social Studies Strand B: People, places and environments