NGSS Crosscutting Concepts Correlations (1 of 2)

The crosscutting concepts identified in the NGSS are seven concepts applicable across disciplinary fields of science and engineering. As students improve their understanding of these concepts, they are better able to think and communicate across traditional scientific disciplinary boundaries and organize information into a coherent worldview. Unlike the performance expectations described above, the crosscutting concepts are not organized into grade-level performance standards.

Crosscutting Concepts	Systems Concept
Patterns. Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.	Students learn to focus on patterns of behavior over time, rather than on specific events
Cause and effect. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated.	Students can identify non-linear causal structures (causal webs), including "side effects," synergistic interactions, and feedback loops within a system.
Scale, proportion, and quantity. In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.	Students can look at the behavior of a system on multiple levels of scale (e.g., individual behavior, ecosystem behavior, regional behavior).
System and systems models. Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.	Students can develop a model of a complex system and use that model to produce reasonable inferences about the system.
Energy and matter. Flows, cycles, and conservation. Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.	Students can distinguish between flows and stocks (or pools) within a system and understand the behavior of a system in terms of changes in these flows and stocks.
Structure and function. The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.	Students can explain how the structure of a system affects the system's behavior over time.
Stability and change. For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.	Students can explain varying levels of stability and rates of change in a system resulting from the relationship between system variables—including feedback loops that span multiple scales.

NGSS Crosscutting Concepts Correlationss (2 of 2)

	Activity	Patterns	Cause and Effect	Scale, Proportion, and Quantity	System and Systems Models	Energy and Matter	Structure and Function	Stability and Change
Module Activities	1	x	x		x			x
	2	x	x		x	x		x
	3	x	x	x	x		x	x
	4		x				x	x
	5		x		x		x	x
	6	x	x				x	
	7		x			x	x	
	8		x	x	x	x		
	9		x			x		
	10		x	x	x	x		
	11		x					
	12	x	x	x	x	x		
	13		x					
	14		x		x			
Systems Enrichment Exercises	Learning About a Tree (Activity 1)		x	x	x		x	
	Dynamic Systems Dance (Activity 1)		x		x			x
	Bathtub Dynamics (Activity 2)	x	x		x	x	x	x
	Riddle Me This (Activity 2)	x	x		x		x	x
	Understanding Climate Momentum (Activity 3)	x	x	x	x		x	x
	Exploring Climate Models: C-LEARN (Activity 3)	x	x	x	x	x	x	x
	Feedback Loops in the News (Activity 5)	x	x	x	x	x	x	x
	How Earthworms Got Me into College (Activity 5)	x	x	x	x		x	x
	The Impacts of Demand for Sustainable Wood (Activity 10)		x	x	x		x	