Indiana Matrix of Crosscutting Concepts

Grades 6, 7, 8

Adopted 2022

Patterns CC.1	1. **Macroscopic patterns are related to the nature of microscopic and atomic-level structure.** 68.CC.1.1 2. **Patterns in rates of change and other numerical relationships can provide information about natural and human designed systems.** 68.CC.1.2 3. **Patterns can be used to identify cause and effect relationships.** 68.CC.1.3 4. **Graphs, charts, and images can be used to identify patterns in data.** 68.CC.1.4
Cause and Effect: Mechanism and Prediction CC.2	1. **Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.** 68.CC.2.1 2. **Cause and effect relationships may be used to predict phenomena in natural or designed systems.** 68.CC.2.2 3. **Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.** 68.CC.2.3
Scale, Proportion, and Quantity CC.3	1. **Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.** 68.CC.3.1 2. **The observed function of natural and designed systems may change with scale.** 68.CC.3.2 3. **Proportional relationships (e.g., speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes.** 68.CC.3.3 4. **Scientific relationships can be represented through the use of algebraic expressions and equations.** 68.CC.3.4 5. **Phenomena that can be observed at one scale may not be observable at another scale.** 68.CC.3.5
Systems and System Models CC.4	1. **Systems may interact with other systems; they may have subsystems and be a part of larger complex systems.** 68.CC.4.1

	2. **Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems.** 68.CC.4.2
	3. **Models are limited in that they only represent certain aspects of the system under study.** 68.CC.4.3
Energy and Matter: Flows, Cycles, and Conservation CC.5	1. **Matter is conserved because atoms are conserved in physical and chemical processes.** 68.CC.5.1
	2. **Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter.** 68.CC.5.2
	3. **Energy may take different forms (e.g. energy infields, thermal energy, energy of motion).** 68.CC.5.3
	4. **The transfer of energy can be tracked as energy flows through a designed or natural system.** 68.CC.5.4
Structure and Function CC.6	1. **Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.** 68.CC.6.1
	2. **Structures can be designed to serve particular functions by taking into account properties of different materials and how materials can be shaped and used.** 68.CC.6.2
Stability and Chance CC.7	1. **Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales, including the atomic scale.** 68.CC.7.1
	2. **Small changes in one part of a system might cause large changes in another part.** 68.CC.7.2
	3. **Stability might be disturbed either by sudden events or gradual changes that accumulate over time.** 68.CC.7.3
	4. **Systems in dynamic equilibrium are stable due to a balance of feedback mechanisms.** 68.CC.7.4