Cross Cutting Concepts

1. Patterns
   1. A repeat. A repeated design. A model or design used as a guide. Symmetry, letters, repeats, DNA< RNA, sun, moon, stars, musical patterns, graphs, charts, similarities, differences, microscopic, macroscopic, classification, relationships.
2. Cause and Effect
   1. Mechanism and Explanation
   2. Simple versus Multifaceted causes
   3. Investigating and explaining causal relationships
   4. Tested across contexts and used to predict events in new contexts
3. Scale, Proportion, Quantity
   1. Relative scale: smaller, bigger, hotter, colder, faster, slower, etc.
   2. Relevance
   3. Size, energy, time, mass, weight, how many
   4. Changes in scale proportion or quantity affect a system’s structure or performance.
   5. Weight, temperature, volume, mass, time, etc.
4. Systems and System Models
   1. Specifying boundaries
   2. Tools for understanding and testing ideas applicable
   3. Throughout science and engineering
5. Energy and Matter
   1. Tracking fluxes into/out of/within helps us understand systems’ possibilities and limitations
6. Structure and Function
   1. Shape and design
   2. Structure of organisms determine many properties and functions
7. Stability and Change
   1. For natural built systems conditions of stability and determinants of rates of change or evolution of a system.
8. Interdependence of Science, Engineering, and Technology
9. Influence of Engineering, Technology, and Science on Society and the Natural World