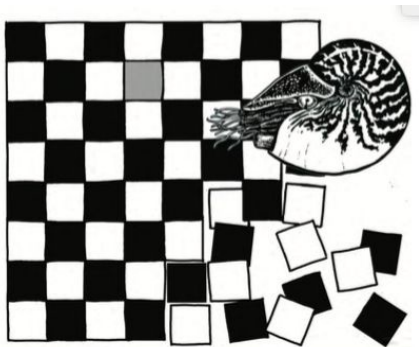
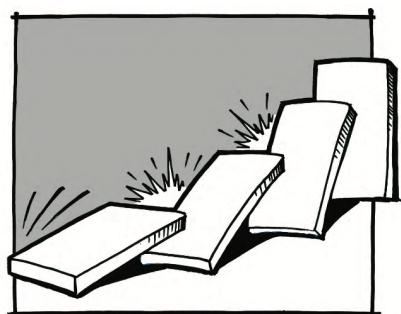


Crosscutting Concepts in Science: The “lens” scientists use to think about the world.



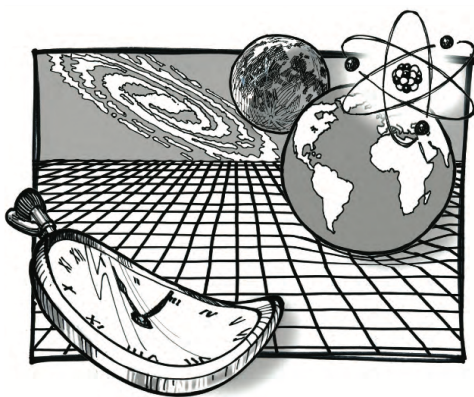
Patterns: Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.

- Patterns help to make sense out of nature.
- Where do you find patterns?



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. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.

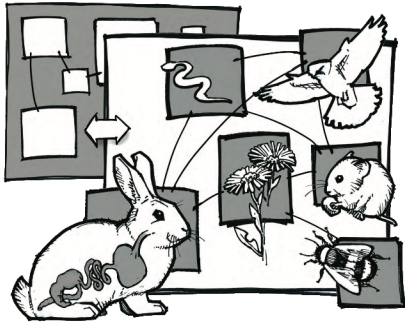
- When we do science we try to find out the reasons why things happen.
- What causes have you identified?
- What effects do they produce?
- What is your evidence?



Scale, Proportion and Quantity:

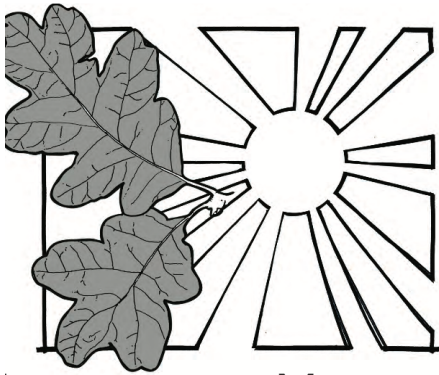
In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.

- Scale, proportion, and quantity help us to understand how nature is different when we study the very large and the very small.
- What have you learned about how things change at different scales?



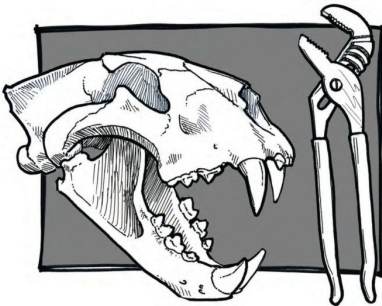
Systems and System Models: Defining the system under study – specifying its boundaries and making explicit a model of that system – provides tools for understanding and testing ideas that are applicable throughout science and engineering.

- Nature is complex and confusing.
- Thinking about systems and making system models can help you to make sense of it.
- What systems can you identify and study?
- How do they connect to other systems?



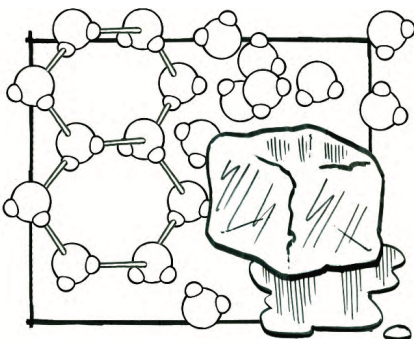
Energy and Matter: Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.

- Energy and Matter change forms but are not created or destroyed.
- Energy flows and matter cycles through natural systems.
- How do energy and matter work in systems that you are studying?



Structure and Function: The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.

- How things are shaped and put together determines what they do.
- Where do you see a relationship between structure and function?



Stability and Change: For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of the system are critical elements of study.

- In nature some things stay the same and some things change.
- Changes can be fast or slow.
- What reasons can you find for things changing or remaining stable?
- How are change and stability connected?