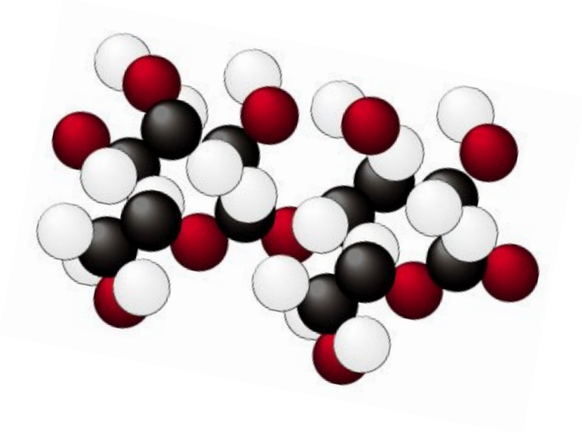
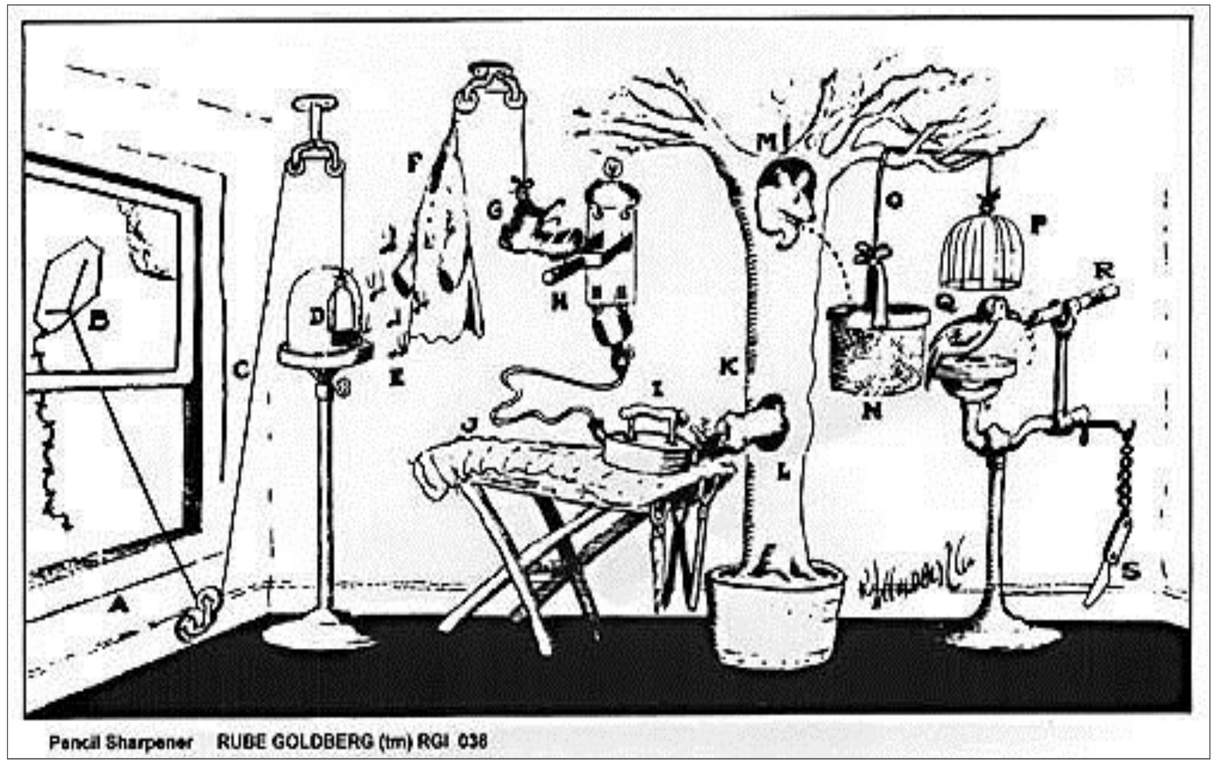


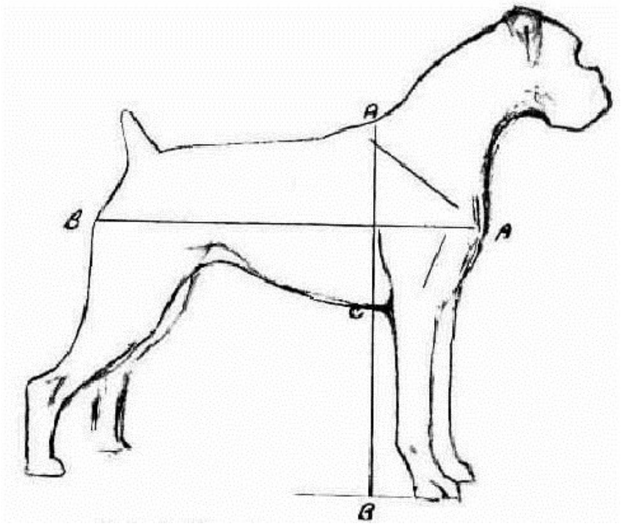
Patterns

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

Cause and effect:
Mechanism and explanation

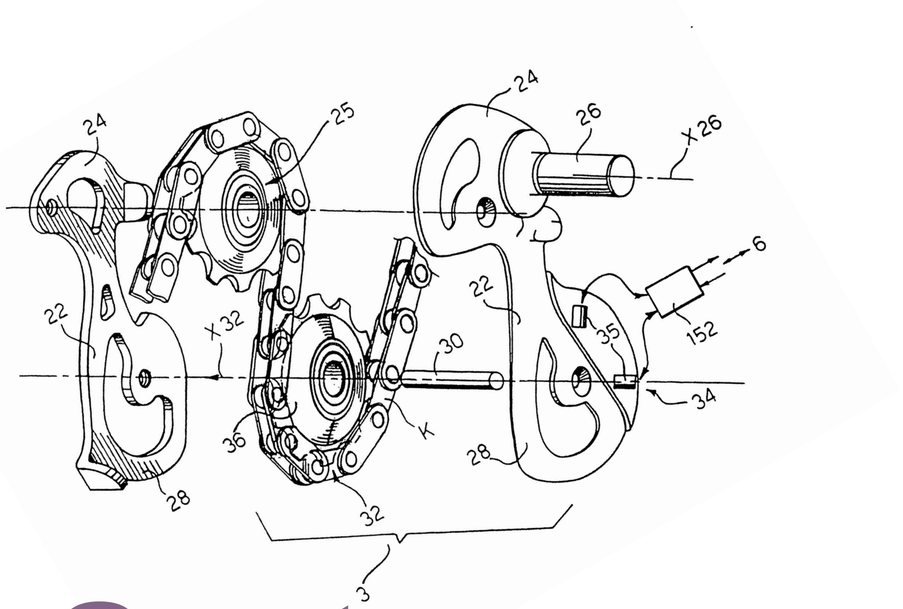
Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in a new context.





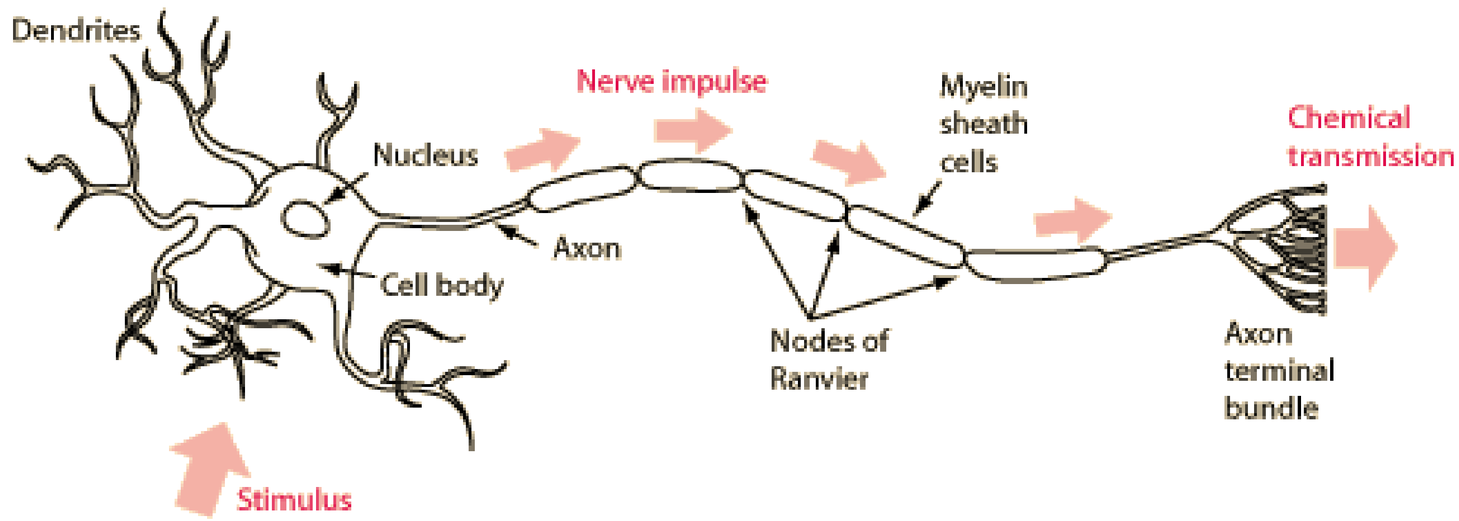
Scale, proportion, and quantity

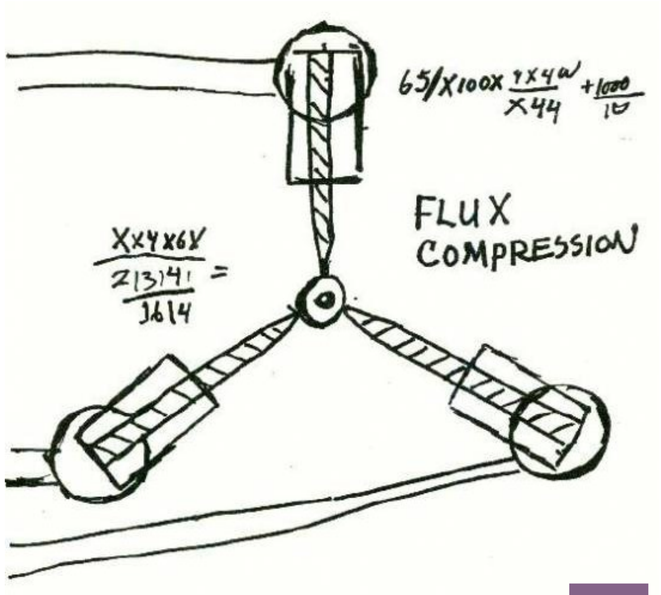
In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.

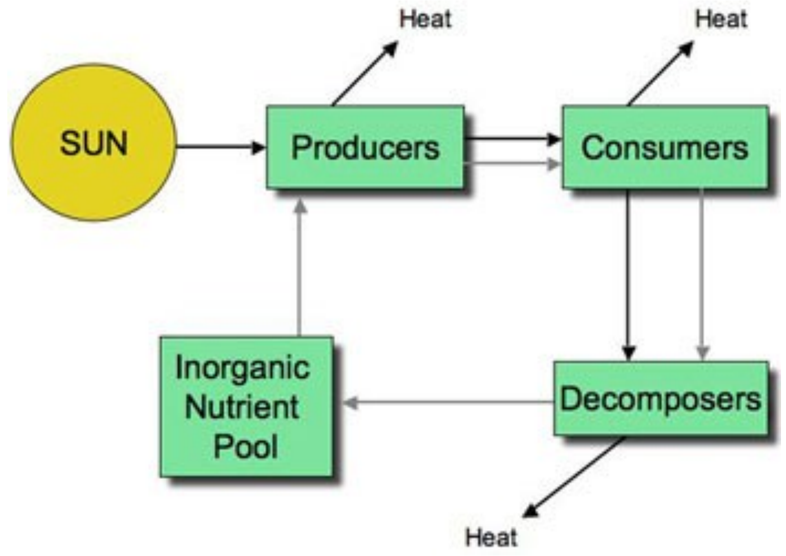


Systems and system models

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.

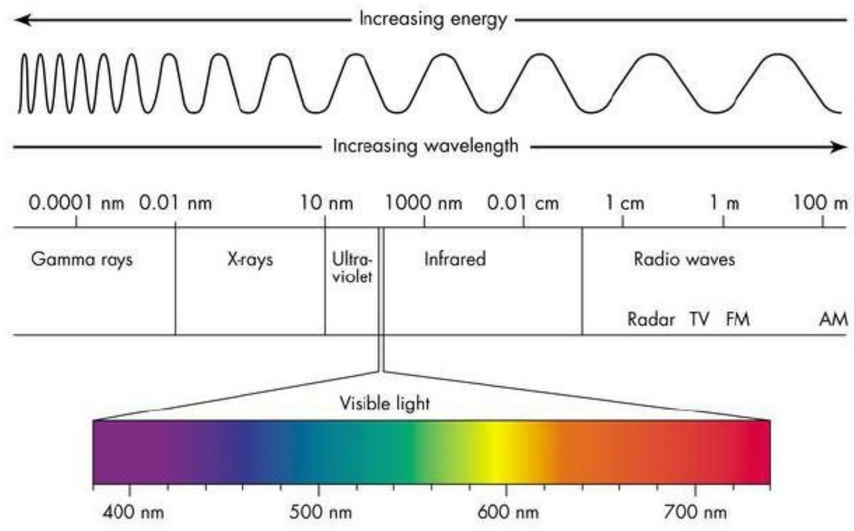


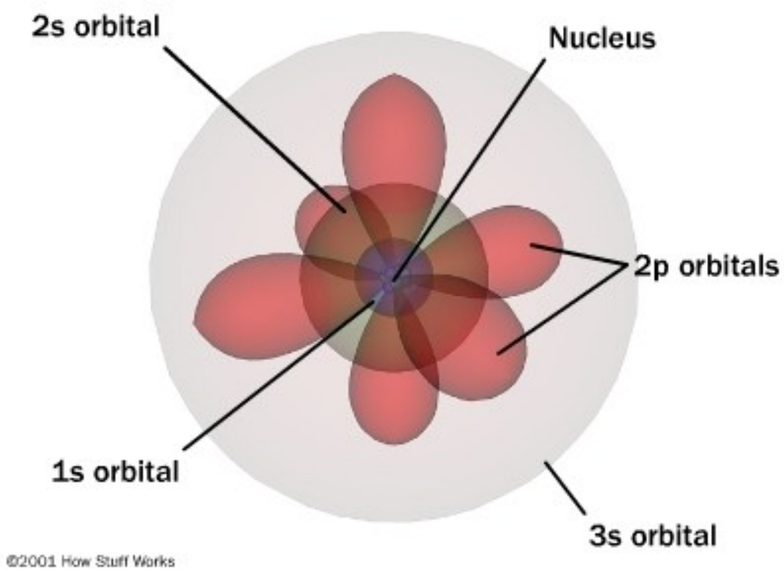




Energy and matter: Flows, cycles, and conservation

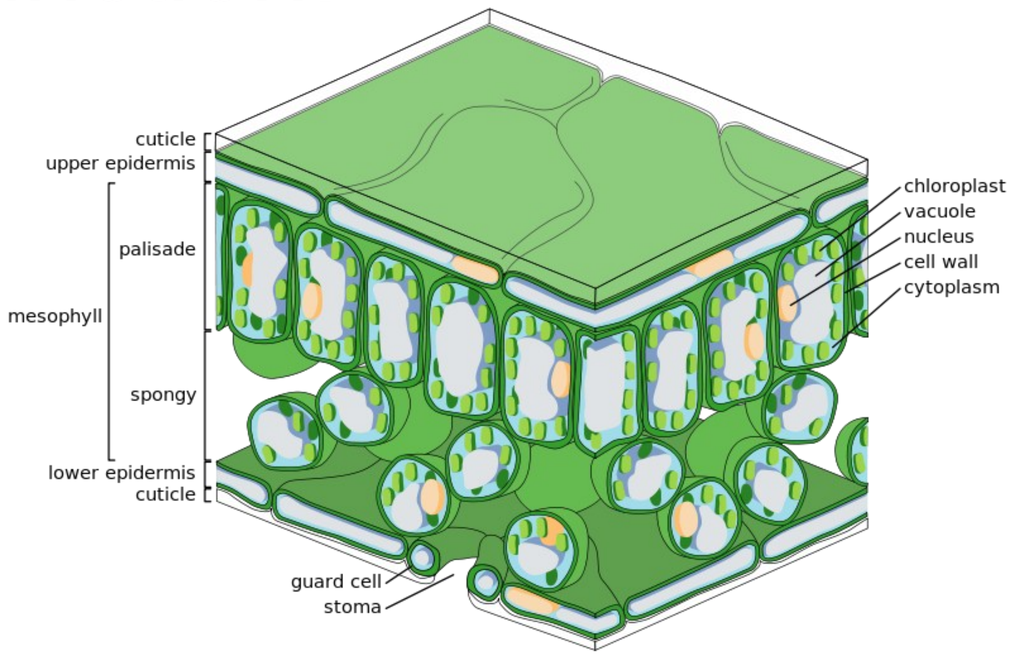
Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.

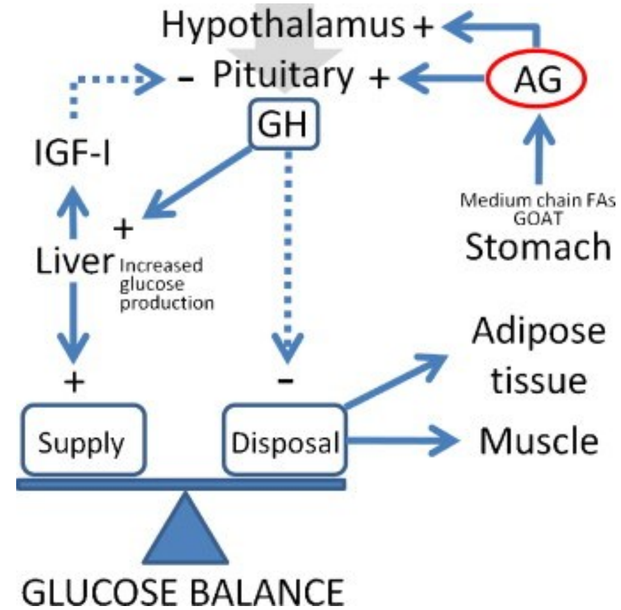




Structure and function

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