

## Ten Unifying Themes in Biology

1. **Emergent properties** - the living world is a hierarchical organization, extending from molecule to biosphere. With each step upward in organizational level, novel properties emerge as a result of interactions among components at lower levels.
2. **The Cell** - cell's are every organisms basic units of structure and function. The two main types of cells are prokaryotic (in bacteria and archaea) and eukaryotic cells (in protists, plants, fungi, and animals).
3. **Heritable Information** - the continuity of life depends on the inheritance of biological information in the form of DNA molecules. The genetic information is encoded in the nucleotide sequence of the DNA.
4. **Structure/function** - form and function are correlated at all levels of biological organization.
5. **Interaction with the environment** - organisms are open systems that exchange materials and energy with their surroundings. An organisms environment includes other organisms as well as nonliving factors.
6. **Regulation** - feedback mechanisms regulate biological systems. In some cases, the regulation maintains homeostasis, a relatively steady state of internal factors such as body temperatures.
7. **Unity and diversity** - biologists group the diversity of life into three domains : Bacteria, Archaea, and Eukarya. As diverse as life is, we can also find unity, such as a universal genetic code. The more closely related two species are, the more characteristics they share.

8. **Evolution** - Evolution, biology's core theme, explains both the unity and diversity of life. The Darwinian theory of natural selection accounts for adaptation of populations to their environment through the differential reproductive success of varying individuals.
  
9. **Scientific Inquiry** - the process of science includes observation- based discovery and the testing of explanations through the hypothetico-deductive. Scientific credibility depends on the repeatability of observation and experiments.
  
10. **Science, technology, and society** - many technologies are goal-oriented applications of science. The relationships of science and technology to society are now more crucial to understand than ever before.