

Appendix 1

Big Ideas in Biologyⁱ

1. Living systems have multiple mechanisms to store, retrieve, and transmit information
2. The process of evolution can explain the diversity and unity of life.
3. Cells are a fundamental structural and functional unit of life.
4. Interdependent relationships characterize biological systems and these interactions give rise to emergent properties
5. Biological systems maintain homeostasis

Big Ideas in Physicsⁱⁱ

1. Objects and systems have properties such as mass and charge. Systems may have internal structure.
2. Fields existing in space can be used to explain interactions
3. The interaction of an object with other objects can be described by forces
4. Interactions between systems can result in changes in those systems
5. Changes that occur as a result of interactions are constrained by conservation laws
6. Waves can transfer energy and momentum from one location to another without the permanent transfer of mass and serve as a mathematical model for the description of other phenomena
7. The mathematics of probability can be used to describe the behavior of complex systems and to interpret the behavior of quantum mechanical systems.

Big Ideas in Chemistryⁱⁱⁱ

1. The chemical elements are fundamental building materials of matter, and all matter can be understood in terms of arrangement of atoms. These atoms retain their identity in chemical reactions.
2. Chemical and physical properties of materials can be explained by the structure and arrangement of atoms, ions, or molecules and the forces between them.
3. Changes in matter involve the rearrangement and or reorganization of atoms and or the transfer of electrons.
4. Rates of chemical reactions are determined by details of the molecular collisions.
5. The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter.
6. Any bond or intermolecular attraction that can be formed can be broken. These two processes are in dynamic competition, sensitive to initial conditions and external perturbations.

Big Ideas in Environmental Science^{iv}

1. Science is a process
2. The earth itself is one interconnected system
3. Humans alter natural systems
4. Environmental problems have a cultural and social context
5. Human survival depends on developing practices that will achieve sustainable systems

ⁱ (Richmond, Einstein and the Photoelectric effect 2005)

ⁱⁱ (College Board 2015)

ⁱⁱⁱ (College Board 2015)

^{iv} (College Board 2015)