BIOLOGY 311C

INTRODUCTORY BIOLOGY I

Developed in collaboration with course transformation project team

Introduction to structure & function, energy flow, and the transmission & expression of genetic information in living systems.

BIG IDEA I

STRUCTURE RELATES TO FUNCTION

1. **Biological Hierarchy:** Biological systems are structured at many interrelated levels.
2. **Chemistry for Biology:** The structure and properties of chemicals determine the behavior and functions of molecules in organisms.
3. **Biological Molecules:** Cell components and cells and made up of biological molecules with specific chemical properties.
4. **Origin of Life**: The first living cells originated by chemical evolution in pre-biotic earth.
5. **Cell Structure:** The structure of cells has evolved to perform a variety of essential functions.
6. **Biological Membrane**: Cell membranes are selectively permeable barriers.
7. **Cell Communication:** Cells communicate with each other and can convert environmental signals to complex integrated responses within a cell.

BIG IDEA II

ENERGY IS TRANSFORMED TO SUSTAIN LIVING SYSTEMS

8. **Metabolism:** Energy transfer and transformation is critical to all aspects of biology from cells to ecosystems.
9. **Respiration:** Organic molecules are broken down in cellular respiration to make ATP.
10. **Photosynthesis:** Light energy is harnessed into chemical bond energy of organic molecules in photosynthesis.

BIG IDEA III

GENETIC INFORMATION IS EXPRESSED AND TRANSMITTED

11. **DNA Structure & Replication:** DNA is the molecule of heredity in all organisms.
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12. **Transcription & Translation:** Genetic information flows from DNA to RNA to protein.
13. **Gene Regulation:** Cells can regulate gene expression at many points during the process.
14. **Recombinant DNA:** Scientists utilize knowledge of gene structure and regulation to express modified genes.
15. **Cell Cycle:** Mitosis is essential for growth, development and reproduction of somatic cells.
16. **Meiosis:** Meiotic cell division leads to gamete formation, generates genetic variability and transmits alleles from one generation to the next.

CORE COMPETENCIES

CONTENT INDEPENDENT

A *Ability to apply the process of science, by practicing observation, hypothesis testing, and experimental design.*

B *Ability to use quantitative reasoning, in data analysis and interpretation.*

C *Ability to use modeling and simulation in a systems biology approach.*

D *Ability to communicate and collaborate with other disciplines.*

E *Ability to understand the relationship between science and society.*