Course Description

8th Grade Science

COURSE DESCRIPTION: This course provides a rigorous and comprehensive foundation for the 8th-grade student about to enter high school science. It covers the relevant topics in all the major scientific disciplines, building on prior knowledge and expanding on subjects introduced earlier in middle school. Students begin with a review of the scientific process and get more into depth with the idea of critical analysis of theories and experimental research. They will move on to discuss principles of physical science and energy. In the life science portion of the course, students will cover structure and function of organisms, genetics and evolution, and tenets of ecology. This will flow into the environmental science topics including earth's cycles and environmental problems. A brief discussion of the solar system will also be covered. Students will learn about the assigned topics through interactive activities, experimentation, discussion, and engaging text and animations. Graded assignments will be stimulating and thought-provoking, hopefully paving the way for future interest in the scientific disciplines.

COURSE OBJECTIVES: After completing the course, students will be able to:

1. Explain and use the methods and tools of scientific inquiry, applying them across scientific disciplines.
2. Identify properties of an atom, element, compound, and mixture, and apply knowledge to use of formulas and equations.
3. Describe the concepts of friction, gravity, waves, and kinetic and potential energy.
4. Apply knowledge of structure and function of organisms to categorize them taxonomically and compare and contrast across the taxonomic levels.
5. Define and give examples of adaptations and explain how they apply to genetics and evolution.
6. Describe energy flow in terms of food webs and trophic levels, involving biotic and abiotic components.
7. Identify features of the major biomes.
8. Describe the environmental cycles involving water, nitrogen, and carbon and discuss the global implications of altering them.
9. Identify sources of environmental distress and discuss different measures that humans are taking, or may take in the future, to improve the health of the planet.

PRE-REQUISITES: None

COURSE LENGTH: One Year

REQUIRED TEXT: None

COURSE OUTLINE:

Unit I: The Scientific Process – Topics include: Review of the Scientific Method • Tools and Measurement • Critical Analysis

Unit II: Chemistry – Topics include: The Atom • Elements, Compounds, and Mixtures • Formulas

Unit III: Physics – Topics include: Force and Motion • Gravity • Waves

Unit IV: Energy – Topics include: Transfer and Conversion of Energy • Specific Heat • Kinetic and Potential Energy • Energy and the environment

Unit V: Life Science – Topics include: Structure and Function of Organisms • Interactions of Systems • Adaptation • Genetics and Evolution

Unit VI: Ecology – Topics include: Flow of energy • Relationships

Unit VII: Environmental Science – Topics include: Biomes • Earth system cycles • Environmental Problems

Unit VIII: Astronomy – Topics include: Characteristics of the solar system