John Burroughs School Science Department
Statement of Philosophy

Summer 2013

The Science Department strives to promote active learning as a model for lifelong self-education. The pursuit of scientific process and knowledge, development of learning skills and enhancement of positive social interactions are all part of the science curriculum. The content of our program is composed of fundamental and powerful ideas that form the structure of the four disciplines: earth science, biology, chemistry and physics.

The acquisition of knowledge builds upon general concepts, scientific methodology, and processes learned in the middle level years (7th and 8th grades) to more complex conceptual ideas and mathematical formulations in the high school. We offer a variety of rigorous courses in the high school to accommodate the learning styles of individual students. All levels relate scientific principles to the real world, foster concern for the environment, promote problem based and inquiry based learning and nurture informed decision-making.

Skills to perform science are taught and utilized throughout our curriculum. The middle level years (7th and 8th grades) focus on concrete skills such as reading for detail, acquiring vocabulary, improving communication skills, searching for information in the library and on the Internet, and developing mathematical skills including graphing by hand as well as on the computer. The upper grades use more advanced and abstract skills such as statistics, logarithms, graphical analysis, and deductive and inductive reasoning. Solving problems using the scientific method is a skill that is practiced by all students, enabling them to recognize problems, formulate hypotheses, and test these hypotheses by the collection and analysis of data. Such practice empowers students to deal with problems both inside and outside the realm of science.

Social values such as respect for others, cooperation with peers, and respect for property of others are developed and reinforced in both laboratory and classroom settings. Frequent work with laboratory partners and teams cultivates positive social interactions and models the teamwork inherent in scientific endeavors. Values are examined and strengthened through open discussion of controversial topics.

The uniqueness of our laboratory program is highlighted by a curriculum that is continuously evolving as teachers craft more creative ways to teach scientific principles and engage students in active learning. For example, students conduct independent or group investigations; experience a four-day field study in the Ozarks to analyze forest and stream ecosystems and deepen their appreciation of their environment; perform physics measurements and calculations on rides at Six Flags; analyze geological formations in southern Missouri; apply mathematical reasoning to observations in the laboratory; and investigate scientific concepts through electronic data collection followed by graphical analysis. While maintaining a laboratory focus in our biology and chemistry college level courses as well as in our advanced studies of ecology and modern physics, seniors may also broaden their perspectives in an interdisciplinary seminar on science and ethics.