

Chemistry activities and demonstrations to support Core Content for Science in Grade 6

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The Kentucky core content provides the following goal for middle school science.

"Goal 2: Students shall develop their abilities to apply core concepts and principles from mathematics, the sciences, the arts, the humanities, social studies, practical living studies, and vocational studies to what they will encounter throughout their lives."

Below we list components of Kentucky's core content for middle school science, and provide the numbers of demonstrations or activities that would support each component. The demonstration numbers refer to our "list of demonstrations", which is a separate document available from <http://www.chem.uky.edu/outreach>. Please see the list of demonstrations to see each indicated demonstration's name and other demonstrations related to it. Anything on the demonstration list is already a working component of our repertoire. However WE ENTHUSIASTICALLY ENCOURAGE requests for new demonstrations to address whatever topic your class is interested in, or struggling with. If you have a new demonstration idea or request, please email Dr. Anne-Frances Miller (afm@uky.edu) so we can have a conversation and come up with something that addresses your class' needs.

The suggested demonstrations and activities have been designed to include colorful demonstrations as well as many that utilize substances and processes encountered in everyday life. These teach that the science lessons learned in school apply far beyond the textbooks, and encourage students to repeat the activities on their own at home.

Grade 6,

Structure and Transformation of Matter: Physical Science

SC-M6 1.1.1 Students will explain how or why mixtures can be separated using physical properties. (A mixture of substances can be separated by exploiting characteristic and divergent physical properties of the components.)

Demonstrations 1.1, 1.2, 1.5, 2.1, 2.1, 3.12, 7.1, 7.2, 7.4, 7.6

SC-M6 1.1.2 Students will identify and describe evidence of chemical and physical changes in matter. (Total mass is conserved, related elements and compounds have related reactivities, patterns of reactivity allow classification and predict utility.)

Demonstrations 1.4, 1.6, 1.7, 1.8, 2.3, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3, 3.4, 3.5, 3.7, 3.8, 3.10, 3.11, 4.7, 4.8, 4.9,

Unity and Diversity: Biological Science

SC-M6 3.4.2 Students will make inferences about the factors influencing behavior based on data/evidence of various organisms behaviors. (Behavior as a response, behavioral response is a set of actions determined in part by heredity and in part from experience, requiring coordination and communication at many levels.)

Demonstrations 8.11, 8.12

Biological Change: Biological Science

SC-M6-3.5.1 Students will explain that biological change over time accounts for the diversity of species developed through gradual processes over many generations. (Selection enriches a population for changes in structures, behaviors and physiology that enhance survival and reproductive success in a particular environment.)

Demonstrations 8.13, 8.14

SC-M6-3.5.2 Students will understand that regulation of an organism's internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required to survive. Maintaining a stable internal environment is essential for an organism's survival.

Demonstrations 3.7, 3.8, 3.9 (Protection against freezing during hibernation by salt and sugar in blood, 8.11, 8.12, (gene regulation)

Energy Transformations: Unifying Concepts

SC-M6-4.6.1 Students will describe or explain the cause and effect relationships between oceans and climate. (Oceans are linked to climate, and large heat capacity of water.)

Demonstrations 3.8, 3.13, 4.9

SC-M6-4.6.2 Students will describe the effects of the sun's energy on the earth system; the connection/relationship between the sun's energy and seasons. (The sun is the major energy source driving water cycle, wind, currents, photosynthesis, and seasons result from the earth's tilt vs. the axis of its orbit around the sun.)

Demonstrations 2.2, 2.3, module 3 (the water cycle), module 6 (energy in light and chemical reactions), module 8 (photosynthesis vs. respiration: how life ties light utilization and CO₂ levels together).