

Chemistry activities and demonstrations to support Core Content for Science in Grade 8

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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 8

Structure and Transformation of Matter: Physical Science

SC-08-1.1.1 Students will: interpret models/representations of elements; classify elements based upon patterns in their physical (e.g., density, boiling point, solubility) and chemical (e.g., flammability, reactivity) properties. (Models enhance understanding that an element is composed of a single type of atom.)

Organization/interpretation of data illustrates that when elements are listed according to the number of protons, repeating patterns of physical (e.g. density, boiling point, solubility) and chemical properties (e.g. flammability, reactivity), can be used to identify families of elements with similar properties.)

Demonstrations 1.1, 1.2, 1.7, 1.8, 2.1, 2.2, 2.3, 2.6, 3.5, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.15, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 6.8, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 8.4, 8.5, 8.6

SC-08-1.1.4 Students will describe interactions which cause the movement of each element among the solid Earth, oceans, atmosphere and organisms (biogeochemical cycles). (Earth is a system containing essentially a fixed amount of each stable chemical atom or element that can exist in several different reservoirs. The interactions within the earth system cause the movement of each element among reservoirs in the solid Earth, oceans, atmosphere and organisms as part of biogeochemical cycles.)

Demonstrations 3.1, 3.2, 3.3, 3.4, 3.6, 6.6, 6.7, 8.1, 8.5, 8.6, 8.7

Unity and Diversity: Biological Science

SC-08-3.4.1 Students will explain the relationship between structure and function of the cell components using a variety of representations. (Observations of cells and analysis of cell representations point out that cells have particular structures that underlie their function. Every cell is surrounded by a membrane that separates it from the outside world. Inside the cell is a concentrated mixture of thousands of different molecules that form a variety of specialized structures. These structures carry out specific cell functions.)

Demonstrations 8.1, 8.7, 8.11, 8.12, 8.13, 8.14

Energy Transformations: Unifying Concepts

SC-08-4.6.1 Students will: explain the cause and effect relationships between global climate and energy transfer; use evidence to make inferences or predictions about global climate issues. (Global climate is determined by energy transfer from the Sun at and near Earth's surface.)

Demonstrations 3.1, 3.2, 3.3, 3.4, 3.6, 6.6, 6.7, 6.9, 8.1, 8.2, 8.5, 8.6, 8.7, 8.8, 8.9

SC-08-4.6.2 Students will: describe or explain energy transfer and energy conservation; evaluate alternative solutions to energy problems. (Energy can be transferred in many ways, but it can neither be created nor destroyed.)

Demonstrations 2.1, 2.2, 2.3, 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.9, 8.1, 8.2, 8.5, 8.6, 8.7, 8.8, 8.9

SC-08-4.6.5 Students will: describe the relationships between organisms and energy flow in ecosystems (food chains and energy pyramids); explain the effects of change to any component of the ecosystem. (Energy flows through ecosystems in one direction from photosynthetic organisms to herbivores to carnivores and decomposers.)

Demonstrations 8.1, 8.3, 8.5, 8.6, 8.7, 8.8, 8.9