Middle Level Science Content Standards

**Standard 1:** Middle level science teachers should understand and use the main ideas in the life, physical, and earth sciences.

Indicator 1: Middle level science teachers demonstrate knowledge of the major concepts, theories, historical developments, and exhibit scientific literacy in the life sciences including the following:

- Genetics
- Cellular parts and processes
- Growth, development, and reproduction
- Structure and function of organisms and their parts
- Human biology and disease
- Evolution
- Ecological relationships and interdependence
- Impact of human beings on the environment

Indicator 2: Middle level science teachers demonstrate knowledge of the major concepts, theories, historical developments, and exhibit scientific literacy in the physical sciences including the following:

- Atomic theory and periodic law
- Structure and properties of matter
- Chemical reactions
- Forces and motion
- Electricity and magnetism
- Waves and optics
- Energy

Indicator 3: Middle level science teachers demonstrate knowledge of the major concepts, theories, historical developments, and exhibit scientific literacy in earth science including the following:

- Geology: composition, structure, formation, properties, changes in, and uses of the earth and earth materials (rocks, minerals, fossils)
- Astronomy: origin and evolution of the universe and solar system, Earth-Moon-Sun system, deep space
- Meteorology and oceanography (global and local)
- Interacting systems and dynamics of the Earth (energy, ecosystems)
- Interaction of the Earth and living systems (pollution, conservation)

**Standard 2: Middle level science teachers demonstrate their knowledge and ability to unify concepts and processes in the life, physical, and earth sciences.**

Indicator 1: Middle level science teachers understand that the study of science is universal and multidisciplinary and that the different sciences are integrated in many ways.
Standard 3: Middle level science teachers understand the nature of science and the development of scientific thought and use that knowledge in their teaching.

Indicator 1: Middle level science teachers understand that scientific theories and laws are consistent with observations and evidence and that knowledge gained has been subjected to challenges, skepticism, and public discussion.

Indicator 2: Middle level science teachers understand that scientific knowledge has been built on previous work, with contributions from diverse cultures, and that scientific advances have affected and changed society.

Indicator 3: Middle level science teachers understand that measurement is the basis upon which scientific laws and theories are based and that advancements in technology have made invaluable contributions to society.

Standard 4: Middle level science teachers understand mathematical concepts and processes and use that knowledge in their science instruction.

Indicator 1: Middle level science teachers should have a working knowledge of algebra, geometry, trigonometry, and probability and statistics.

Indicator 2: Middle level science teachers know how to chart and graph data and to interpret data from a variety of charts and graphs.

Standard 5: Middle level science teachers model safe and appropriate scientific investigations and procedures to develop problem solving and critical thinking skills.

Indicator 1: Middle level science teachers know and use necessary and appropriate safety laws, codes, and standards for all science activities.

Indicator 2: Middle level science teachers develop inquiry-based lessons and investigations that direct students to confront specific science concepts or issues and scientific knowledge.

Indicator 3: Middle level science teachers demonstrate the ability to anticipate questions, misconceptions, and necessary materials that help facilitate student learning of science concepts and issues in inquiry-based lessons and investigations.

Indicator 4: Middle level science teachers demonstrate the ability to model and facilitate the development of young adolescents’ process skills in science inquiry and investigation.
Standard 6: Middle level science teachers demonstrate their ability to design instruction that unifies science disciplines conceptually and procedurally to help young adolescents understand the natural world.

Indicator 1: Middle level science teachers know the meaning of and use unifying concepts and processes to facilitate the learning of scientific concepts and principles by providing an interdisciplinary approach to the teaching of science.