



STATE OF MICHIGAN
DEPARTMENT OF EDUCATION
LANSING



JENNIFER M. GRANHOLM
GOVERNOR

MICHAEL P. FLANAGAN
SUPERINTENDENT OF
PUBLIC INSTRUCTION

MEMORANDUM

TO: State Board of Education

FROM: Michael P. Flanagan, Chairman

DATE: November 26, 2007

SUBJECT: Approval of the K-7 Science Grade Level Content Expectations

At the November 13, 2007 State Board of Education meeting, the Board reviewed the K-7 Content Expectations for Science, developed by committees chaired by Larry Casler from Genesee Intermediate School District – Math/Science Center and Liz Niehaus from Niehaus and Associates, Inc.

A question regarding the completion of K-7 expectations, instead of K-8 was raised at that meeting. The rationale for the K-7 grade range for Science Grade Level Content Expectations is as follows:

With the approval of the new High School Science Content Expectations, a major concern was raised that students would not have the opportunity to master the four disciplines' expectations prior to the 11th grade Michigan Merit Exam. Districts began to view the 8th grade as a time to start addressing the HSCE.

Science MEAP assessment is in the fall of both the 5th and 8th grades. More details are provided in the attached rationale.

In addition, standard statements have been provided for greater clarity for the entire document (see attachment). The complete K-7 Science Grade Level Content Expectations provides a set of expectations that will guide K-7 science instruction and assessment in Michigan.

It is recommended that the State Board of Education approve the K-7 Science Grade Level Content Expectations, as presented at the November 13 Board meeting with the addition of standard statements.

STATE BOARD OF EDUCATION

KATHLEEN N. STRAUS – PRESIDENT • JOHN C. AUSTIN – VICE PRESIDENT
CAROLYN L. CURTIN – SECRETARY • MARIANNE YARED MCGUIRE – TREASURER
NANCY DANHOF – NASBE DELEGATE • ELIZABETH W. BAUER
REGINALD M. TURNER • CASANDRA E. ULBRICH

608 WEST ALLEGAN STREET • P.O. BOX 30008 • LANSING, MICHIGAN 48909
www.michigan.gov/mde • (517) 373-3324

Rationale for K-7 Science Grade Level Content Expectations

Since 1991 with the release of the Michigan Essential Goals and Objectives for Science Education (MEGOSE) middle school science in Michigan is defined as grades 5-7 and high school science is defined as grades 8-12. This practice continued with the 1996 Michigan Curriculum Framework (MCF) and the 2000 version of the MCF Science standards. The K-7 Grade Level Content Expectations (GLCE) document continues this practice.

In 1991, the state assessments for science were given in the fall of the school year for grades 5 and 8. After a few years of winter assessments, the science assessment for MEAP has returned to the fall schedule for grades 5 and 8. The National Assessment of Educational Progress (NAEP) follows this same schedule for 8th grade science. The question was raised by middle school science teachers: "What content will we teach since the middle school science assessment is given in early 8th grade?" The science curriculum in Michigan is written for 8th grade to be part of high school.

Three years ago when assessment for mathematics and English language arts (ELA) was required to be annual for grades 3-8, MDE decided to move either social studies or science out of 8th grade so that students would not take all four assessments in one year. Social studies assessment was moved to 9th grade, leaving science assessment in 8th grade to allow continuation of the 5-7 middle school and 8-12 high school grade span configurations.

With the new graduation requirements and the release of the High School Science Content Expectations (HSSCE) last year, school districts expressed concern about the increased rigor associated with the science expectations. A major concern was the ability of districts to ensure all students have the opportunity to master the four disciplines' essential expectations prior to the 11th grade Michigan Merit Exam. Districts became resourceful with creative schedules and many are using their 8th grade to address the high school essential science expectations. If 8th grade had specific grade level expectations in addition to K-7 expectations and high school expectations, the flexibility to address the HSSCE by districts would be diminished. School districts have expressed appreciation for allowing this flexibility in 8th grade.

Content Area	Grades Taught	Fall of Grade Assessed
Social Studies	K-5	6
	6-8	9
	9-12	11
Science	K-4	5
	5-7	8
	8-12	11

K-7 Science Standard Statements



Discipline 1: Science Processes

Standard IP: Inquiry Process

Develop an understanding that scientific inquiry and reasoning involves observing, questioning, investigating, recording, and developing solutions to problems.

Standard IA: Inquiry Analysis and Communication

Develop an understanding that scientific inquiry and investigations require analysis and communication of findings, using appropriate technology.

Standard RS: Reflection and Social Implications

Develop an understanding that claims and evidence should be analyzed for their scientific merit. Understand how scientists decide what constitutes scientific knowledge. Develop an understanding of the importance of reflection on scientific knowledge and its application to new situations to better understand the role of science in society and technology.

Discipline 2: Physical Science

Standard FM: Force and Motion

Develop an understanding that the position and/or motion of an object is relative to a point of reference. Understand forces affect the motion and speed of an object and that the net force on an object is the total of all of the forces acting on it. Understand the Earth pulls down on objects with a force called gravity. Develop an understanding that some forces are in direct contact with objects, while other forces are not in direct contact with objects.

Standard EN: Energy

Develop an understanding that there are many forms of energy (such as heat, light, sound, and electrical) and that energy is transferable by convection, conduction, or radiation. Understand energy can be in motion, called kinetic; or it can be stored, called potential. Develop an understanding that as temperature increases, more energy is added to a system. Understand nuclear reactions in the sun produce light and heat for the Earth.

Standard PM: Properties of Matter

Develop an understanding that all matter has observable attributes with physical and chemical properties that are described, measured, and compared. Understand that states of matter exist as solid, liquid, or gas; and have physical and chemical properties. Understand all matter is composed of combinations of elements, which are organized by common attributes and characteristics on the Periodic Table. Understand that substances can be classified as mixtures or compounds and according to their physical and chemical properties.

Standard CM: Changes in Matter

Develop an understanding of changes in the state of matter in terms of heating and cooling, and in terms of arrangement and relative motion of atoms and molecules. Understand the differences between physical and chemical changes. Develop an understanding of the conservation of mass. Develop an understanding of products and reactants in a chemical change.

Discipline 3: Life Science

Standard OL: Organization of Living Things

Develop an understanding that plants and animals (including humans) have basic requirements for maintaining life which include the need for air, water, and a source of energy. Understand that all life forms can be classified as producers, consumers, or decomposers as they are all part of a global food chain where food/energy is supplied by plants which need light to produce food/energy. Develop an understanding that plants and animals can be classified by observable traits and physical characteristics. Understand that all living organisms are composed of cells and they exhibit cell growth and division. Understand that all plants and animals have a definite life cycle, body parts, and systems to perform specific life functions.

Standard HE: Heredity

Develop an understanding that all life forms must reproduce to survive. Understand that characteristics of mature plants and animals may be inherited or acquired and that only inherited traits are passed on to their young. Understand that inherited traits can be influenced by changes in the environment and by genetics.

Standard EV: Evolution

Develop an understanding that plants and animals have observable parts and characteristics that help them survive and flourish in their environments. Understand that fossils provide evidence that life forms have changed over time and were influenced by changes in environmental conditions. Understand that life forms either change (evolve) over time or risk extinction due to environmental changes and describe how scientists identify the relatedness of various organisms based on similarities in anatomical features.

Standard EC: Ecosystems

Develop an understanding of the interdependence of the variety of populations, communities, and ecosystems, including those in the Great Lakes region. Develop an understanding of different types of interdependence and that biotic (living) and abiotic (non-living) factors affect the balance of an ecosystem. Understand that all organisms cause changes, some detrimental and others beneficial, in the environment where they live.

Discipline 4: Earth Science

Standard ES: Earth Systems

Develop an understanding of the warming of the Earth by the sun as the major source of energy for phenomenon on Earth and how the sun's warming relates to weather, climate, seasons, and the water cycle. Understand how human interaction and use of natural resources affects the environment.

Standard SE: Solid Earth

Develop an understanding of the properties of earth materials and how those properties make materials useful. Understand gradual and rapid changes in earth materials and features of the surface of Earth. Understand magnetic properties of Earth.

Standard FE: Fluid Earth

Develop an understanding that Earth is a planet nearly covered with water and that water on Earth can be found in three states, solid, liquid, and gas. Understand how water on Earth moves in predictable patterns. Understand Earth's atmosphere as a mixture of gases and water vapor.

Standard ST: Earth in Space and Time

Develop an understanding that the sun is the central and largest body in the solar system and that Earth and other objects in the sky move in a regular and predictable motion around the sun. Understand that those motions explain the day, year, moon phases, eclipses and the appearance of motion of objects across the sky. Understand that gravity is the force that keeps the planets in orbit around the sun and governs motion in the solar system. Develop an understanding that fossils and layers of Earth provide evidence of the history of Earth's life forms, changes over long periods of time, and theories regarding Earth's history and continental drift.