QUICK REFERENCE: 4TH GRADE SCIENCE STANDARDS

A. SCIENCE CONNECTIONS

Content Standard
Students in Wisconsin will understand that among the science disciplines, there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change, and measurement; evolution, equilibrium, and energy; and form and function.

These themes relate and interconnect the Wisconsin science standards to one another. Each theme is further defined in the glossary following the science standards.

Rationale:

These unifying themes are ways of thinking rather than theories or discoveries. Students should know about these themes and realize that the more they learn about science the better they will understand how the themes organize and enlarge their knowledge. Science is a system and should be seen as a single discipline rather than a set of separate disciplines. Students will also understand science better when they connect and integrate these unifying themes into what they know about themselves and the world around them.

PERFORMANCE STANDARDS

By the end of grade 4 students will:

A.4.1 When conducting science investigations*, ask and answer questions that will help decide the general areas of science being addressed

A.4.2 When faced with a science-related problem, decide what evidence*, models*, or explanations* previously studied can be used to better understand* what is happening now

A.4.3 When investigating* a science-related problem, decide what data can be collected to determine the most useful explanations*

A.4.4 When studying science-related problems, decide which of the science themes* are important

A.4.5 When studying a science-related problem, decide what changes* over time are occurring or have occurred

B. NATURE OF SCIENCE

Content Standard
Students in Wisconsin will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.

Rationale:

Students will realize that scientific knowledge is developed from the activities of scientists and others who work to find the best possible explanations of the natural world. Researchers and those who are involved in science follow a generally accepted set of rules to produce scientific knowledge that others can confirm through experimentation. This knowledge is public, replicable, and undergoing revision and refinement based on new experiments and data.

PERFORMANCE STANDARDS

By the end of grade 4 students will:

B.4.1 Use encyclopedias, source books, texts, computers, teachers, parents, other adults, journals, popular press, and various other sources, to help answer science-related questions and plan investigations

B.4.2 Acquire information about people who have contributed to the development of major ideas in the sciences and learn about the cultures in which these people lived and worked

B.4.3 Show* how the major developments of scientific knowledge in the earth and space, life and environmental, and physical sciences have changed over time

C. SCIENCE INQUIRY

Content Standard
Students in Wisconsin will investigate questions using scientific methods and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.

Rationale:

Students should experience science in a form that engages them in actively constructing ideas and explanations and enhances their opportunities to develop the skills of doing science. Such inquiry (problem solving) should include questioning, forming hypotheses, collecting and analyzing data, reaching conclusions and evaluating results, and communicating procedures and findings to others.

PERFORMANCE STANDARDS

By the end of grade 4 students will:

C.4.1 Use the vocabulary of the unifying themes* to ask questions about objects, organisms, and events being studied

C.4.2 Use the science content being learned to ask questions, plan investigations*, make observations*, make predictions*, and offer explanations*

C.4.3 Select multiple sources of information to help answer questions selected for classroom investigations*

C.4.4 Use simple science equipment including rulers, balances, graduated cylinders, hand lenses, thermometers, and computers safely and effectively to collect data relevant to questions and investigations*

C.4.5 Use data they have collected to develop explanations* and answer questions generated by investigations*

C.4.6 Communicate the results of their investigations* in ways their audiences will understand by using charts, graphs, drawings, written descriptions, and various other means

C.4.7 Support their conclusions with logical arguments

C.4.8 Ask additional questions that might help focus or further an investigation*

D. PHYSICAL SCIENCE

Content Standard
Students in Wisconsin will demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.

Rationale:

Knowledge of the physical and chemical properties of matter and energy is basic to an understanding of the earth and space, life and environmental, and physical sciences. The properties of matter can be explained in terms of the atomic structure of matter. Natural events are the result of interactions of matter and energy. When students understand how matter and energy interact, they can explain and predict chemical and physical changes that occur around them.

PERFORMANCE STANDARDS

By the end of grade 4 students will:

Properties of Earth Materials

D.4.1 Understand* that objects are made of more than one substance, by observing, describing, and measuring the properties of earth materials, including properties of size, weight, shape, color, temperature, and the ability to react with other substances

D.4.2 Group* and/or classify objects and substances based on the properties of earth materials

D.4.3 Understand* that substances can exist in different states—solid, liquid, gas

D.4.4 Observe* and describe* changes* in form, temperature, color, speed, and direction of objects and construct* explanations* for the changes

D.4.5 Construct* simple models* of what is happening to materials and substances undergoing change*, using simple instruments or tools to aid observations and collect data

Position and Motion of Objects

D.4.6 Observe* and describe* physical events in objects at rest or in motion

D.4.7 Observe* and describe* physical events involving objects and develop record-keeping systems to follow these events by measuring and describing changes in their properties, including position relative to another object, motion over time, and position due to forces

Light, Heat, Electricity, and Magnetism

D.4.8 Ask questions and make observations to discover* the differences between substances that can be touched (matter) and substances that cannot be touched (forms of energy, light, heat, electricity, sound, and magnetism)

E. EARTH AND SPACE SCIENCE

Content Standard
Students in Wisconsin will demonstrate an understanding of the structure and systems of the earth and other bodies in the universe and their interactions.

Rationale:

By studying the earth, its composition, history, and the processes that shape it, students gain a better understanding of the planet on which they live. Understanding these geologic, meteorological, astronomical, and oceanographic processes allows students to make responsible choices and to evaluate the consequences of their choices. In addition, all bodies in space, including the earth, are influenced by forces acting throughout the solar system and the universe. Studying the universe enhances students' understanding of the earth's origins, its place in the universe, and its future.

PERFORMANCE STANDARDS

By the end of grade 4 students will:

Properties of Earth Materials

E.4.1 Investigate* that earth materials are composed of rocks and soils and correctly use the vocabulary for rocks, minerals, and soils during these investigations

E.4.2 Show* that earth materials have different physical and chemical properties, including the properties of soils found in Wisconsin

E.4.3 Develop descriptions* of the land and water masses of the earth and of Wisconsin's rocks and minerals, using the common vocabulary of earth and space science

Objects in the Sky

E.4.4 Identify* celestial objects (stars, sun, moon, planets) in the sky, noting changes in patterns of those objects over time

Changes in the Earth and Sky

E.4.5 Describe* the weather commonly found in Wisconsin in terms of clouds, temperature, humidity, and forms of precipitation, and the changes* that occur over time, including seasonal changes

E.4.6 Using the science themes*, find patterns and cycles in the earth's daily, yearly, and long-term changes*

E.4.7 Using the science themes*, describe* resources used in the home, community, and nation as a whole

E.4.8 Illustrate* resources humans use in mining, forestry, farming, and manufacturing in Wisconsin and elsewhere in the world

F. LIFE AND ENVIRONMENTAL SCIENCE

Content Standard
Students in Wisconsin will demonstrate an understanding of the characteristics and structures of living things, the processes of life, and how living things interact with one another and their environment.

Rationale:

Students will enhance their natural curiosity about living things and their environment through study of the structure and function of living things, ecosystems, life cycles, energy movement (transfer), energy change (transformation), and changes in populations of organisms through time. Knowledge of these concepts and processes of life and environmental science will assist students in making informed choices regarding their lifestyles and the impact they have on communities of living things in their environment.

PERFORMANCE STANDARDS

By the end of grade 4 students will:

The Characteristics of Organisms

F.4.1 Discover* how each organism meets its basic needs for water, nutrients, protection, and energy* in order to survive

F.4.2 Investigate* how organisms, especially plants, respond to both internal cues (the need for water) and external cues (changes in the environment)

Life Cycles of Organisms

F.4.3 Illustrate* the different ways that organisms grow through life stages and survive to produce new members of their type

Organisms and Their Environment

F.4.4 Using the science themes*, develop explanations* for the connections among living and nonliving things in various environments

G. SCIENCE APPLICATIONS

Content Standard
Students in Wisconsin will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.

Rationale:

Science and technology complement each other. Science helps drive technology and technology provides science with tools for investigation, inquiry, and analysis. Together, science and technology applications provide solutions to human problems, needs, and aspirations. Students should understand that advances in science and technology affect the earth's systems.

PERFORMANCE STANDARDS

By the end of grade 4 students will:

G.4.1 Identify* the technology used by someone employed in a job or position in Wisconsin and explain* how the technology helps

G.4.2 Discover* what changes in technology have occurred in a career chosen by a parent, grandparent, or an adult friend over a long period of time

G.4.3 Determine what science discoveries have led to changes in technologies that are being used in the workplace by someone employed locally

G.4.4 Identify* the combinations of simple machines in a device used in the home, the workplace, or elsewhere in the community

G.4.5 Ask questions to find answers about how devices and machines were invented and produced

H. SCIENCE IN SOCIAL AND PERSONAL PERSPECTIVES

Content Standard
Students in Wisconsin will use scientific information and skills to make decisions about themselves, Wisconsin, and the world in which they live.

Rationale:

An important purpose of science education is to give students a means to understand and act on personal, economic, social, political, and international issues. Knowledge and methodology of the earth and space, life and environmental, and physical sciences facilitate analysis of topics related to personal health, environment, and management of resources, and help evaluate the merits of alternative courses of action.

PERFORMANCE STANDARDS

By the end of grade 4 students will:

H.4.1 Describe* how science and technology have helped, and in some cases hindered, progress in providing better food, more rapid information, quicker and safer transportation, and more effective health care

H.4.2 Using the science themes*, identify* local and state issues that are helped by science and technology and explain* how science and technology can also cause a problem

H.4.3 Show* how science has contributed to meeting personal needs, including hygiene, nutrition, exercise, safety, and health care

H.4.4 Develop* a list of issues that citizens must make decisions about and describe* a strategy for becoming informed about the science behind these issues