



**KENOSHA UNIFIED SCHOOL DISTRICT NO. 1
CURRICULUM AND INSTRUCTIONAL SERVICES
STANDARDS AND BENCHMARKS
SCIENCE**

GRADE 6

STANDARD A: SCIENCE CONNECTIONS—STUDENTS WILL UNDERSTAND AND DESCRIBE THE UNIFYING CONCEPTS AND PROCESSES AMONG SCIENCE TOPICS WHICH LEAD TO CONNECTIONS BETWEEN PHYSICAL SCIENCE, EARTH/SPACE SCIENCE, AND LIFE SCIENCE.

A-1: Systems

A system can include processes as well as things.

Any system is usually connected to other systems, both internally and externally.

A-2: Models

Models are often used to think about processes that are not easily observed.

Different models can be used to represent the same thing.

A-3: Change and Constancy

Physical and biological systems tend to change until they become stable and then remain that way unless their surroundings change.

A-4: Scale

As the complexity of any system increases, gaining an understanding of it depends increasingly on summaries, such as averages and ranges, and on descriptions of typical examples of that system.

A-5: Connections

The study of earth and space science, life and environmental science, and physical science are interconnected by unifying themes.

STANDARD B: NATURE OF SCIENCE—STUDENTS WILL UNDERSTAND THAT THE STUDY OF SCIENCE IS ONGOING, AND THEORIES AND CONCEPTS IN SCIENCE CHANGE OVER TIME AS NEW EVIDENCE IS FOUND. SCIENTIFIC EXPLANATIONS MUST ADHERE TO CRITERIA SUCH AS: A PROPOSED EXPLANATION MUST BE LOGICALLY CONSISTENT, IT MUST ABIDE BY THE RULES OF EVIDENCE, IT MUST BE OPEN TO QUESTIONS AND POSSIBLE MODIFICATION, AND IT MUST BE BASED ON HISTORICAL AND CURRENT SCIENTIFIC KNOWLEDGE.

B-1: Science is a Human Endeavor, and There are Many Commonly Known Careers in Science.

Women and men of various social and ethnic backgrounds engage in the activities of science, engineering, and related fields.

Many people choose science as a career and devote their lives to studying it.

Some scientists work alone and some in teams, but all communicate extensively with others.

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B-2: Nature of Scientific Process and Knowledge

Scientists formulate and test their explanations of nature using observations and experiments.

It is part of scientific inquiry to evaluate the results of scientific investigations, experiments, observations, theoretical models, and the explanations proposed by other scientists.

It is common for scientists to differ with one another about the interpretation of the evidence or theory being considered.

B-3: History of Science

Many individuals have contributed to the traditions of science. Studying some of these individuals provides further understanding of scientific inquiry, science as a human endeavor, the nature of science, and the relationships between science and society.

STANDARD C: SCIENCE INQUIRY—STUDENTS WILL INVESTIGATE QUESTIONS USING SCIENTIFIC METHODS AND TOOLS, REVISE THEIR PERSONAL UNDERSTANDING TO ACCOMMODATE KNOWLEDGE, AND COMMUNICATE THOSE UNDERSTANDINGS TO OTHERS.

C-1: Ask Questions about Objects, Organisms, and Events in the Everyday World.

Identify, formulate, and clarify questions that can be answered through scientific investigations using appropriate equipment and resources.

C-2: Make Connections to Prior Knowledge.

Use prior knowledge of scientific facts, concepts, and investigations to make predictions and help answer the question being investigated.

C-3: Gather Background Knowledge Related to the Questions Being Investigated.

Locate and access data and scientific knowledge in age-appropriate information sources and reference materials. (See English/ Language Arts and Information and Technology Literacy Standards.)

C-4: Design and Conduct Responsible and Safe Investigations to Help Answer Questions.

Demonstrate knowledge of age-appropriate safe laboratory procedures.

Design, plan, and conduct investigations that involve the identification of independent (manipulated) and dependent (responding) and controlled variables and determining which is the most logical data to collect.

C-5: Safely Use Appropriate Senses, Equipment and Tools to Make Observations and Gather Data.

Select and use appropriate tools and equipment to make accurate observations and SI measurements for the purpose of scientific investigation.

C-6: Collecting and Representing Qualitative and Quantitative Data

(See Math Standard E.)

Collect and organize qualitative and quantitative data in a journal, lab report, record sheet, or by using media and technology appropriate to purpose and content.

Create and interpret appropriate types of graphs (bar graphs, line graphs, pie graphs).

C-7: Summarizing, Synthesizing, Inferring, and Building Explanations

Analyze and interpret qualitative and quantitative data for experimental errors; and use them to build explanations, develop models, and raise further questions.

Use the explanations and models found in science to develop likely explanations for the results of the investigation.

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C-8: Communicating Results

Complete a lab report or journal.

Share, defend, and revise results, explanations, and procedures using media and technology appropriate to purpose and content.

STANDARD D: PHYSICAL SCIENCE —STUDENTS 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.

D-1: Properties of Matter

(No Sixth Grade Benchmarks)

D-2: Structure of Matter

(No Sixth Grade Benchmarks)

D-3: Physical, Chemical and Nuclear Changes in Matter

(No Sixth Grade Benchmarks)

D-4: Position and Motion of Objects

(No Sixth Grade Benchmarks)

D-5: Forces of Nature

(No Sixth Grade Benchmarks)

D-6: Interactions of Energy and Matter

Living things use energy.

D-7: Conservation of Energy

The total energy of the universe is constant. Energy can be transferred in many ways, but it can never be destroyed.

STANDARD E: EARTH SCIENCE—STUDENTS WILL DEMONSTRATE AN UNDERSTANDING OF THE STRUCTURE AND SYSTEMS OF EARTH AND THE UNIVERSE AND OF THEIR INTERACTIONS.

E-1: Properties and Structures of the Earth and its Materials

The solid earth is layered with a lithosphere; hot, convecting mantle; and dense, metallic core.

Lithospheric plates constantly move at rates of centimeters per year in response to movements in the mantle.

Major geological events, such as earthquakes, volcanic eruptions, and mountain building, result from lithospheric plate motions.

Landforms are the result of a combination of constructive forces (crystal deformation, volcanic eruption, deposition of sediment) and destructive forces (weathering, erosion).

Soil consists of weathered rocks and decomposed organic material from dead plants, animals, and bacteria. Soils are often found in layers.

Water is a solvent. As it passes through the water cycle it dissolves minerals and gases and carries them to the oceans.

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Living organisms have played many roles in the earth system, including affecting the composition of the atmosphere, producing some types of rocks, and contributing to the weathering of rocks.

E-2: History and Changes of the Earth

The earth processes we see today, including erosion, movement of lithospheric plates, and changes in atmospheric composition, are similar to those that occurred in the past.

Climates have sometimes changed abruptly in the past as a result of changes in the earth's crust.

Thousands of layers of sedimentary rock confirm the long history of the changing surface of the earth and the changing life forms whose remains (fossils) are found in successive layers.

The youngest layers are not always found on top.

Human activities have changed the earth's land, oceans, and atmosphere. Some of these changes have decreased the capacity of the environment to support some life forms.

E-3: Cycles in the Earth System

Some changes in the solid earth can be described as the "rock cycle."

Water circulates through the crust, oceans, and atmosphere in what is known as the "water cycle."

E-4: The Earth, Our Solar System, and Space

(No Sixth Grade Benchmarks)

STANDARD F: LIFE AND ENVIRONMENTAL SCIENCE —STUDENTS 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.

F-1: Characteristics, Structure, and Function in Living Things

Living systems at all levels demonstrate the complementary nature of structure and function.

Organisms have a variety of body plans and internal structures to accomplish the functions required for life.

All organisms are composed of cells. Many organisms are single cells; others are multicellular.

Important levels of organization for structure and function include cells, organs, tissues, organ systems, whole organisms, and ecosystems.

The functions that are required for life include obtaining and using resources, growing, reproducing, and maintaining stable internal conditions by sensing and responding to a constantly changing external environment.

In classifying organisms, biologists consider details of internal and external structures and processes and the evidence of common ancestry to be more important than behavior or general appearance.

Disease is a breakdown in structures or functions of an organism and can be caused by intrinsic failure of a system or infection by other organisms.

F-2: Life Cycles and Heredity of Living Things

Reproduction is essential to the continuation of every species.

Every organism requires a set of instructions for specifying its traits. Heredity is the passage of these instructions from one generation to another.

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Hereditary information is contained in genes, located in the chromosomes of each cell. Each gene carries a single unit of information. An inherited trait of an individual can be determined by one or by many genes, and a single gene can influence more than one trait.

Some traits are inherited, and others result from interactions with the environment.

Some organisms reproduce asexually, which means all the genes come from a single parent.

In sexual reproduction, a single specialized cell from a female merges with a specialized cell from a male. As the fertilized egg, carrying genetic information from each parent, multiplies to form the complete organism, the same genetic information is copied in each cell.

F-3: Organisms, Populations, and Ecosystems

Millions of species of animals, plants, and microorganisms are alive today.

F-4: Matter and Energy in Living Systems

(No Sixth Grade Benchmarks)

STANDARD G: SCIENCE APPLICATIONS—STUDENTS WILL DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIP BETWEEN SCIENCE AND TECHNOLOGY AND THE WAYS IN WHICH THAT RELATIONSHIP INFLUENCES HUMAN ACTIVITIES.

G-1: The Process of Technological Design

Identify appropriate problems for technological design, design a solution or product, implement a proposed design, evaluate completed technological designs or products, and communicate the process of technological design.

G-2: Abilities to Distinguish Between Natural Objects and Objects Made by Humans

Propose a design (or redesign) of an applied science model or a machine that will have an impact in the community or elsewhere in the world.

G-3: Understanding About Science and Technology

Technology impacts trends in science and scientific research.

Science and technology have both positive and negative impacts on our culture.

Scientists rely on technology to enhance the gathering and manipulation of data.

STANDARD H: SCIENCE IN SOCIAL AND PERSONAL PERSPECTIVES—STUDENTS WILL USE SCIENCE INFORMATION AND SKILLS TO MAKE INFORMED DECISIONS ABOUT THEMSELVES, THEIR COMMUNITY, AND THE WORLD IN WHICH THEY LIVE.

H-1: Personal and Community Health

Natural environments may contain substances (for example, radon and lead) that are harmful to human beings. Maintaining environmental health involves establishing or monitoring quality standards related to use of soil, water, and air.

H-2: Human Population Growth

When an area becomes over-populated, the environment will become degraded due to the increased use of resources.

H-3: Types of Resources

Humans have used renewable and nonrenewable natural resources through history.

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The global environment is affected by national policies and practices relating to energy use, waste disposal, ecological management, manufacturing, and population.

H-4: Quality of and Changes in Environments

Internal and external processes of the earth system cause natural hazards (earthquakes, landslides, wildfires, volcanic eruptions, floods, storms, asteroid impact) that change or destroy human and wildlife habitats, damage property, and harm or kill living organisms.

Human activities (resource acquisition, urban growth, land-use decisions, and waste disposal) can induce hazards and can accelerate many natural changes.

H-5: Science and Technology in Society

Societal challenges often inspire questions for scientific research.

Technology influences society through its products and processes.

Social needs, attitudes and values influence the direction of technological development.