



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

**STANDARDS AND BENCHMARKS  
SCIENCE**

**GRADE 7**

**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.*

Many systems contain feedback mechanisms that serve to keep changes within specified limits.

*Equations can be used to summarize how the quantity of something changes over time or in response to other changes.*

**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, experiment, and theoretical and mathematical models.*

*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.**

*Formulate a testable hypothesis suggested by current social issues, scientific literature, or observations of phenomena; and demonstrate its connections to scientific concepts.*

**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).*

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**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.*

**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**

*A substance has characteristic chemical and physical properties, all of which are independent of the amount of the sample.*

*There are groups of elements that have similar properties.*

*Elements can be solids, liquids, or gases.*

*When elements are listed in order by the number of protons in their nucleus, the same sequence of properties appears over and over again in the list (periodic table).*

**D-2: Structure of Matter**

*All matter is made up of atoms, which are far too small to see directly through a microscope.*

*A substance composed of a single kind of atom is called an element.*

*Different arrangements of atoms compose all substances and atoms may be bonded together.*

*A compound is formed when two or more kinds of atoms bind together chemically.*

*An atom's nucleus is a tiny fraction of the volume of an atom.*

*Atoms are made of a positive nucleus surrounded by negative electrons.*

*The nucleus of an atom consists of positively charged protons and neutrons which have no charge but which affect the mass and stability of the atom.*

*Atoms may stick together in well-defined molecules or may be packed together in large arrays. Different arrangements of atoms compose all substances.*

*Atoms and molecules are in constant motion.*

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

*A mixture of substances often can be separated into the original substances using one or more physical properties.*

*Increased temperature means greater average energy of motion, so most substances expand when heated.*

Elements combine in a multitude of ways to produce compounds, which account for the living and non-living substances that we encounter. The properties of the new substances may be very different from those of the old.

Atoms do not break down during normal laboratory reactions.

**D-4: Position and Motion of Objects**

*The motion of an object can be described by its position, direction of motion, and speed. That motion can be measured and represented on a graph.*

*An object will stay still or keep its direction of motion and its speed, unless an unbalanced force acts on it.*

*Laws of motion are used to calculate precisely the effects of forces on the motion of objects.*

*The forces that act on an object can reinforce or cancel one another depending on their direction and magnitude.*

**D-5: Forces of Nature**

(No Seventh Grade Benchmarks)

**D-6: Interactions of Energy and Matter**

**Heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature.**

**Heat can be transferred through materials by the collisions of atoms or across a space by radiation. If the material is fluid, currents will be set up in it that aid the transfer of heat.**

**All energy can be considered to be either kinetic energy, which is the energy of motion; potential energy, which depends on relative position; or energy contained by a field, such as electromagnetic waves.**

**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**

*Three-fourths of the earth's surface is covered by a relatively thin layer of water, and the entire planet is surrounded by a relatively thin blanket of air.*

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

*Fresh water is limited in supply and is essential for life and for most industrial processes.*

*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.*

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***E-2: History and Changes of the Earth***  
(No Seventh Grade Benchmarks)

***E-3: Cycles in the Earth System***

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

*The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor. The atmosphere has different properties at different elevations.*

*The cycling of water in and out of the atmosphere plays an important role in cloud formation and determining weather and climatic patterns.*

*Seasons result from variations in the amount of the sun’s energy hitting the surface due to the tilt of the earth’s rotation on its axis and the length of the day.*

*Global patterns of atmospheric movement influence local weather.*

*Oceans have a major effect on climate. The patterns of stars in the sky stay the same, although they appear to move across the sky nightly. Different stars can be seen in different seasons.*

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

*The sun is the major source of energy for phenomena on the earth’s surface such as weather and ocean currents.*

*Gravity is the force that keeps planets in orbit around the sun and governs the rest of the motion in the solar system.*

**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***

(No Seventh Grade Benchmarks)

***F-2: Life Cycles and Heredity of Living Things***

(No Seventh Grade Benchmarks)

***F-3: Organisms, Populations, and Ecosystems***

*A population consists of all individuals of a species that occur together at a given place and time.*

*For sexually reproducing organisms, a species comprises all organisms that can mate with one another to produce fertile offspring.*

Biological evolution accounts for the diversity of species developed through gradual processes over many generations.

Species acquire many of their unique characteristics and behaviors through biological adaptations, which involve the selection of naturally occurring variations in populations.

Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival.

Fossils provide evidence that many organisms that lived long ago are extinct.

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*All populations living together and the physical factors with which they interact compose an ecosystem.*

*Food webs identify the relationships among producers, consumers, and decomposers in an ecosystem.*

*Organisms may interact with each other in relationships that may be beneficial or harmful to one or both organisms.*

*The number of organisms an ecosystem can support depends on the available biotic and abiotic resources.*

**F-4: Matter and Energy in Living Systems**

*The major source of energy for ecosystems is sunlight.*

*Populations of organisms can be categorized by the function they serve in an ecosystem—producers, consumers, and decomposers.*

*Energy entering ecosystems as sunlight is transferred by producers (plants and some micro-organisms) into chemical energy through photosynthesis.*

*Most consumers are animals, which depend on producers for energy in the form of food. Some consumers eat plants for food. Others eat animals that eat the plants.*

*Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food.*

*The energy contained in food is released through chemical processes.*

*Matter and energy change form and are transferred from one organism to another repeatedly.*

*Matter and energy are transferred between organisms and their physical environment.*

*The total amount of matter and energy remains constant, even though its form and location change.*

**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; and show how the design (or redesign) might work, including potential side effects.

**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.

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**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.*

*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.*