



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

**STANDARDS AND BENCHMARKS  
SCIENCE**

**GRADE 8**

**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, experiments, 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**

(No Eighth Grade Benchmarks)

**D-2: Structure of Matter**

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

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

*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.*

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

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

*When substances interact chemically to form new substances, the elements composing them combine in new ways.*

*Regardless of how substances within a closed system interact, the total mass of the system remains the same.*

*Atoms do not break down during normal laboratory reactions.*

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

(No Eighth Grade Benchmarks)

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**D-5: Forces of Nature**

*Everything on or anywhere near the earth is pulled toward the earth's center by gravitational force.*

*Every object exerts gravitational force on every other object. The force depends on how much mass the objects have and on how far apart they are.*

*The electric force is a universal force that exists between any two charged objects. There are two kinds of charges—positive and negative.*

*Opposite charges attract, while like charges repel.*

*Electric currents and magnets can exert a force on each other.*

*Moving electric charges produce magnetic forces, and moving magnets produce electric forces.*

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

*Most of what goes on in the universe involves some form of energy being transformed into another.*

*Energy in the form of heat is almost always one of the products of an energy transformation.*

*The sun's energy arrives as light with a range of wavelengths, consisting of visible light infrared, and ultraviolet radiation.*

*The visible light from the sun is made up of a mixture of many different colors of light, even though to the eye the light looks almost white.*

*Light interacts with matter by transmission, absorption, or scattering.*

*Vibrations in materials set up wavelike disturbances that transfer energy and spread away from the source.*

*These and other waves move at different speeds in different materials.*

*Electrical circuits provide a means of converting electrical energy into other forms of 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**

*Earth is the only body in the solar system that appears able to support life.*

*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**

(No Eighth Grade Benchmarks)

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

(No Eighth Grade Benchmarks)

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

*The earth is the third planet from the sun in a system that includes the moon; the sun; seven other planets and their moons; and smaller objects, such as asteroids and comets.*

*Most objects in the solar system are in regular and predictable motion. Those motions explain such phenomena as the day, the year, phases of the moon, and eclipses.*

*The planets, having different sizes, surface features and compositions, move around the Sun in oval (elliptical) orbits, and some planets have a variety of moons and rings of particles orbiting around them.*

*There are many different stars, and they have different properties.*

*The sun is a medium-sized star and is the central and largest body in our solar system.*

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

*Gravity explains the phenomena of the tides.*

*The universe contains billions of galaxies, each containing billions of stars.*

*A light year is a unit of distance.*

**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**

*All organisms are composed of cells.*

*Many organisms are single celled; others are multicellular.*

*Cells continually divide to make more cells for growth and repair.*

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

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

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

*Heredity 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.*

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

*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.*

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

(No Eighth 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**

Design, build, evaluate, and revise models and explanations related to the earth and space, life and environmental, and physical sciences.

**G-3: Understanding About Science and Technology**

*Technology impacts trends in science and scientific research.*

*Scientific knowledge can be used to make real-life decisions.*

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.*

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

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**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.*