School District of Nekoosa

Benchmarks for Science

May 2007

The benchmarks are educational goals that are established for the students in the district. As educators, we will do our best to provide all students with the instruction required to meet these goals.

Kindergarten

Life Science

1. Students will be able to understand the difference between living and non-living. A.4.1, C.4.1, C.4.2, C.4.4, F.4.1.
2. Students will observe and identify some plants, animals, their life cycles and basic needs of living organisms. A.4.1, C.4.1, C.4.2, C.4.4, F.4.1

Earth Science

3. Students will practice taking care of the earth by demonstrating processes such as reducing, reusing and recycling. A.4.1, A.4.2, A.4.5, C.4.2, C.4.8, D.4.7, E.4.6.
4. Students will be able to describe the earth's surface. (Oceans, lakes and mountains) B.4.1, C.4.1, C.4.8, E.4.2, F.4.1, F.4.2, F.4.4.
5. Students will observe and describe the daily weather. A.4.1, A.4.2, A.4.5, C.4.2, E.4.5.
6. Students will be able to identify the four seasons. A.4.3, A.4.5, C.4.1, E.4.6.

Space Science

7. Students will be able to describe day, night and objects in the sky. (Moon, stars, sun and clouds) A.4.1, A.4.2, B4.1, C.4.1, C.4.2, E.4.4, E.4.5, E.4.6.

Physical Science

8. Students will be able to describe and identify attributes of different matter. (Solid, liquid, gas, light and heavy) C.4.1, C.4.2, C.4.4, D.4.3, E.4.5.
9. Students will be able to develop a concept of where heat and light come from. C.4.1, C.4.2, C.4.4, D.4.3, E.4.5.
10. The students will develop the basic concepts of movement such as push and pull. C.4.1, C.4.2, C.4.4, D.4.3, E.4.5. G 4.4

1st Grade

Life Science

1. Students will be able to identify roots, stem, and leaves, of a plant and will express the function of these parts. C 4.1, C 4.2, C 4.3, A 4.1, F 4.1, C4.6
2. Students will discover that animals have different attributes and animals can grow and change. C 4.6, F 4.1, F 4.3, A4.1
3. Students will discover and explain how plants and animals live together in habitats that meet their needs. F 4.1, F4.2, F 4.4, C4.1, C4.2, B4.1, C4.6. A4.1

Earth Science

4. Students will correctly use the terms for rocks, minerals and soils during investigations of these materials. E4.1, E4.2, C4.6, B4.1, A4.1
5. Using the earth materials terms, students will describe these resources as they are used in the home, community, and nation as a whole. E4.7, B4.1, C4.6, A4.1
6. Students will describe how weather can vary. C4.4, E4.5, E4.6, A4.1

Space Science

7. Students will demonstrate a basic understanding of the relationship of the sun, Earth, and moon. E4.4, C4.4, B4.1. A4.1

Physical Science

8. Students will express a basic understanding of solids, liquids and gases, through investigations. D4.3, B4.1, A4.1
9. Students will investigate and then describe basic properties of heat, light, sound and magnetism. D4.8, B4.1, A4.1
10. Students will develop a basic understanding that simple machines make our work easier. G4.4, B4.1, C4.6, D4.6, A4.1

2nd Grade

Life Science

1. Students will investigate how plants grow and change and how people use plants. A.4.1, A.4.5, C.4.4, C.4.6, F.4.2
2. Students will discover how animals can be grouped, illustrate animal life cycles, list animals and their habitats, and explain how animals protect themselves. E.4.1, F.4.1, F.4.2, F.4.3

Earth Science

3. Students will identify and describe land and water masses of the Earth. B.4.1, E.4.3
4. Students will describe the weather commonly found in Wisconsin in terms of clouds, temperature, and forms of precipitation, and the changes that occur over time, including seasonal changes. A.4.1, A.4.2, A.4.3, A.4.5, E.4.5, E.4.6

Space Science

5. Students will demonstrate what causes day and night. B.4.1, B.4.3, E.4.4
6. Students will list objects in the solar system. C.4.4, E.4.4

Physical Science

7. Students will use characteristics of objects to classify them as solids, liquids, or gases. D.4.3, D.4.5
8. Students will identify sources of heat, light, sound, and magnetic fields. D.4.4, D.4.8
9. Students will acquire information that will allow them to begin to identify the six simple machines. D.4.6, D.4.7, G.4.4

3rd Grade

Science Connections

1. Students will demonstrate the ability to compare previously studied scientific facts, models, or explanations with current observations to show that things change, stay the same, or follow a pattern.

Nature of Science

2. Students will demonstrate the ability to communicate an understanding about science using simple graphs to show how scientific knowledge has changed over time.

Science Inquiry

3. Students will demonstrate the ability to plan, predict, and conduct simple investigations and use evidence collected to explain results.
4. Students will clearly express evidence from data collected to justify/explain conclusions from investigations.
5. Students will demonstrate the ability to report to different audiences by using graphs, tables, and illustrations.

Physical Science

6. Students will be able to compare and contrast physical changes and chemical changes related to matter.

7. Students will be able to identify the six simple machines, how they make work easier, identify common tools in the home, workplace, and community, and identify the simple machines within the tool.
8. Students will be able to identify forms of energy (heat, light, sound, electric, magnetic) and explain the differences and similarities between them.
9. Students will be able to develop and express an explanation of how sounds are made, how they travel, and how they are used.

Earth and Space Science

10. Students will describe the changing earth forms and the express the importance of natural resources.
11. Students will be able to illustrate the water cycle including evaporation, condensation, and precipitation.
12. Students will compare and contrast objects in the solar system (sun, planets, moons, asteroids.)

Life and Environmental Science

13. Students will be able to group plants and group animals
14. Students will be able to illustrate various life cycles such as plants, insects, frogs, and mammals.
15. Students will provide explanations of how plants and animals live together.

Science Applications

16. Students will explain how careers have changed as technology has changed over time.
17. Students will determine which science discoveries have led to changes in technologies and explain how examples are being used in the workplace by someone employed locally.

Science in Social and Personal Perspectives

18. Students will list examples of how science and technology have affected food quality and quantity, transportation, health, sanitation, and communication.

4th Grade

1. Students will express an understanding of Earth's movements and tilt causing day and night and seasons. A.4.2, E.4.4
2. Students will express an understanding of the stages of the water cycle. A.4.5, E.4.6
3. Students will express an understanding of the weather in terms such as air temperature, air pressure, wind speed, humidity, and precipitation and the instruments that are used to measure them. B.4.3, C.4.2, E.4.5
4. Students can demonstrate how to make electricity flow through a closed circuit. A.4.1, A.4.2, D.4.8
5. Students will express an understanding that Earth's surface and landforms can be changed through things such as volcanoes, earthquakes, weathering, and erosion. A.4.4, D.4.2, E.4.1
6. Students will express an understanding of plants and animals being classified based on similarities and differences. C.4.1, F.4.1, F.4.2
7. Students will express an understanding of energy passing from organism to organism via food chains. F.4.1, F.4.4

5th Grade

1. Students will express a basic understanding of the properties of matter and how matter is classified according to those properties. D.8.1, D.8.2, D.8.3, D.8.4, D.8.10
2. Students will express basic understanding of how forces affect the motion of objects. D.8.5, D.6 3
3. Students will express a basic understanding of the relationship between the forms of energy and how we use energy. D.8.8, D.8. 9
4. Students will express a basic understanding that the Earth is in a state of constant change, both internal and external. E.8.1, E.8.2, E.8.3, E.8.4, E.8.5

5. Students will express a basic understanding of the types of resources and how those resources are used. E.8.6, D.8.7
6. Students will express a basic understanding of the characteristics of a living thing. F.8.1, F.8. 3

6th Grade

1. Students will have an understanding of basic ecological facts concerning solid waste disposal and sewage treatment. A.8.1, A.8.2, A.8.6, A.8.8.
2. Students will have an understanding and an appreciation of basic chemistry concepts and express how these concepts relate to their everyday lives. C.8.5, D. 8.1, D.8.2, D.8.4, D.8.8, D.8.9
3. Students will understand basic concepts of electricity and be able to build and effectively use electrical circuits. B.8.6, C.8.1, D 8.8, D.8.9.
4. Students will understand the fundamental concepts of major ecological concerns such as the greenhouse effect, acid rain, rain forest depletion, and the loss of the ozone layer. F.8.9, F.8.10
5. Students will demonstrate a developing interest and appreciation of various rocks and minerals. They will be able to identify a variety of samples. E.8.1, E.8.4, E.8.5.
6. Students will demonstrate an understanding of the basic concepts used to form information presented in a weather forecast. They will demonstrate the skills needed to present a computerized forecast. E.4.5, E.4.6
7. Students will express an understanding of basic concepts of simple machines. D.8.5, D.8.6, D.8.7

7th Grade

1. Students will express an understanding of the characteristics of life for all organisms. A.8.1, B.8.6, F.8.1, F.8.6
2. Students will understand the importance and characteristics of Bacteria. B.8.6, F.8.1, H.8.3
3. Students will understand the importance and characteristics of Protists. F.8.1, F.8.2
4. Students will understand the importance and characteristics of Fungi. F.8.1, B.8.6, H.8.3
5. Students will understand the importance and characteristics of Plants. F.8.1, G.8.3, F.8.2
6. Students will express an understanding of genetics and the relationship of the importance between DNA, genes, chromosomes, mitosis, meiosis, and fertilization in organisms. B.8.1, F.8.4
7. Students will express an understanding of how different parts of an animal work together. F.8.1, F.8.2
8. Students will be able to perform a dissection of an organism and be able to identify each part, know the function of these parts, and explain what system they are in. F.8.1, F.8.2
9. Students will express an understanding of the ecosystem and its abiotic and biotic components. F.8.2, F.8.7, F.8.8, F.8.9

8th Grade

1. Students will express an understanding that chemical reactions are attributed to the atomic structure of reactants. A.8.6, D.8.2, D.12.4
2. Students will express an understanding that minerals have a chemical make-up and that rocks are mixtures of minerals. C.8.3, D.8.3
3. Students will express an understanding that earthquakes and volcanoes happen along specific geographic boundaries, which, in theory, are plate boundaries. B.8.5, E.8.2, G.8.2
4. Students will be able to list two geographical features of the state of Wisconsin that show evidence of glacial activity. B.8.2, C.8.9
5. Students will be able to locate Earth's place in space. A.12.4, B.8.1, D12.10, E.8.7, E.12.5
6. Students will express an understanding of the relationship between pressure and weather. C.8.4, E.8.3

High School

Biology

1. Students will express an understanding of the characteristics of all living things including cell structure and function. F.12.1, F.12.2
2. Students will express an understanding of how organisms reproduce, including genetics and heredity. F.12.3, F.12.4
3. Students will express an understanding of how living things are classified and organized.
4. Students will express an understanding of the basic characteristics of bacteria, viruses, protists, and fungi. G.12.1
5. Students will express an understanding of the basic characteristics of invertebrate animals. F.12.6, F.12.12
6. Students will express an understanding of the basic characteristics of vertebrate animals. F.12.6, F.12.12
7. Students will demonstrate safe and proper dissection skills.
8. Students will demonstrate proper microscope usage skills.

Accelerated Biology

1. Students will express an understanding of the characteristics of all living things including cell structure and function. F.12.1, F.12.2
2. Students will express an understanding of how organisms reproduce, including genetics and heredity. F.12.3, F.12.4
3. Students will express an understanding of how living things are classified and organized.
4. Students will express an understanding of the basic characteristics of bacteria, viruses, protists, and fungi. G.12.1
5. Students will express an understanding of the basic characteristics of invertebrate animals. F.12.6, F.12.12
6. Students will express an understanding of the basic characteristics of vertebrate animals. F.12.6, F.12.12
7. Students will demonstrate safe and proper dissection skills.
8. Students will demonstrate proper microscope usage skills.

Physical Science
(Benchmarks will updated during the 2007/2008 school year)

1. Students will express an understanding of scientific inquiry by designing experiments, analyzing data, drawing conclusions. A.12.3, A.12.7, H.12.2
2. Students will demonstrate the ability to use models to predict actions and events in the natural world including the ideas of constancy and change. A.12.6, A.12.7, H.12.2
3. Students will demonstrate an understanding of structures and properties of matter including states of matter, their classification, and organic and biological molecules. D.12.1, D.12.2, D.12.3, D.12.4, D.12.10
4. Students will express an understanding of chemical interactions with acids, bases and salts. D.12.2, D.12.4, D.12.5, D.12.6
5. Students will demonstrate knowledge of simple machines including calculating mechanical advantage. D.12.5, D.12.6, D.12.7
6. Students will demonstrate understanding of the mechanics of waves in light, sound, mirrors and lenses. D.12.8, D.12.11

7. Students will be proficient in science process skills including: observation, inference, predictions, measurement, calculating, classifying, and using tables and graphs. C.12.3, C.12.4

Accelerated Physical Science
(Benchmarks will updated during the 2007/2008 school year)

1. Students will express an understanding of scientific inquiry by designing experiments, analyzing data, drawing conclusions. A.12.3, A.12.7, H.12.2
2. Students will demonstrate the ability to use models to predict actions and events in the natural world including the ideas of constancy and change. A.12.6, A.12.7, H.12.2
3. Students will demonstrate an understanding of structures and properties of matter including states of matter, their classification, and organic and biological molecules. D.12.1, D.12.2, D.12.3, D.12.4, D.12.10
4. Students will express an understanding of chemical interactions with acids, bases, and salts. D.12.2, D.12.4, D.12.5, D.12.6
5. Students will demonstrate knowledge of simple machines including calculating mechanical advantage. D.12.5, D.12.6, D.12.7
6. Students will demonstrate understanding of the mechanics of waves in light, sound, mirrors, and lenses. D.12.8, D.12.11
7. Students will be proficient in science process skills including: observation, inference, predictions, measurement, calculating, classifying, and using tables and graphs. C.12.3, C.12.4

Environmental Science
(Benchmarks will updated during the 2007/2008 school year)

1. Students will demonstrate communication skills through appropriate questions and analysis and also by developing research skills using such things as resource banks. C.12.7, H.12.6
2. Student will demonstrate knowledge of environmental processes and systems including geochemical cycles, biomes, and ecosystems. E.12.2, F.12.5, F.12.9, H.12.3, H.12.5
3. Students will demonstrate environmental investigation skills incorporating lab techniques, record keeping management and advanced technology. C.12.3
4. Students will explore Wisconsin's environmental history to gain an understanding of decisions and actions, policies, ethics and leaders. A.12.1, A.12.2, C.12.3, G.12.5, H.12.1, H.12.2, H.12.3, H.12.5
5. Students will demonstrate personal and civic responsibility by undertaking a supervised volunteer and community collaboration. G.12.3, G.12.4, H.12.1, H.12.3, H.12.5

Human Anatomy and Physiology

1. Students will express an understanding of cells, their functions and differentiation. F.12.1, F.12.2
2. Students will express an understanding of the systems of the human body, their functions and interactions. C. 12.7, F.4.1
3. Students will demonstrate proper dissection skills of mammalian organs and organisms.
4. Students will express an understanding of common diseases and disorders of the human body.
5. Students will be proficient in science process skills including: observation, inference, prediction, measurements, calculating, classifying, using graphs and microscope usage skills. C.12.3, C.12.4

Concepts of Chemistry
(Benchmarks will updated during the 2007/2008 school year)

1. Students will be able to practice laboratories with proper conduct and safety measures. C.12.3, C.12.4
2. Students will demonstrate the ability to balance a chemical equation and identify the type of reaction that takes place. D.12.4, D12.5
3. Students will demonstrate the ability to explain the differences between the states of matter in relation to kinetic theory. D.12.1, D.12.2
4. Students will express the gas laws and explain how they relate to everyday life. C.12.3, D.12.2
5. Students will be able to differentiate between ionic and covalent compounds. D.8.1, D.12.2
6. Students will be able to express an understanding of logical problem solving in math and apply it to lab experiences. C.12.3, D.12.3

Chemistry
(Benchmarks will updated during the 2007/2008 school year)

1. Students will be able to summarize a laboratory experiment in proper form. C.12.3, C.12.4
2. Students will express an understanding of the relationships between mass and energy. D.12.3, A.12.3
3. Students will demonstrate the ability to balance a chemical equation and to identify the type of reaction. D.12.4, D.12.5
4. Students will demonstrate the ability to solve math in chemistry problems. C.12.3, D.12.3
5. Students will demonstrate the ability to explain the differences between the states of matter in relation to the kinetic theory. D.12.1, D.12.2
6. Students will understand the basic concepts of organic chemistry and apply this to polymer chemistry. A.12.5, G.12.1
7. Students will differentiate between ionic and covalent compounds and the properties of each. D.12.1, D.12.2
8. Students will express an understanding of the parts of the atom and in particular the movement of electrons as it relates to light. D.12.1, A.12.7

Organic Chemistry
(Benchmarks will updated during the 2007/2008 school year)

1. Student will express a general knowledge of organic functional groups. D.8.1, D.12.1, D.12.2
2. Students will demonstrate use of nomenclature specific to an organic functional group. D.12.2
3. Student will express physical properties and reactions characteristic to each organic functional group. D.12.4, D.12.5, D.12.6
4. Students will demonstrate proficiency in specialized lab techniques.
5. Students will demonstrate how to integrate appropriate technology into coursework while undertaking labs, completing some assignments, and researching topics.
6. Students will demonstrate practical solutions using organic chemistry to solve scenarios. B.12.4, D.12.2, G.12.2, G.12.3, H.12.2, H.12.6,

Physics

1. Students will demonstrate the ability to solve velocity and acceleration problems. D.12.5, D.12.6
2. Students will demonstrate a basic understanding of sound and its subtopics. D.12.8, D.12.9
3. Students will demonstrate an understanding of the connection between physics and the real world by performing practical experiments. C.12.5, C.12.6
4. Students will express an understanding of the connection between Newton's Laws and many physics topics. D.12.4, D.12.5

5. Students will express an understanding of the value of contributions from famous people of the past who were visionaries in physics. A.12.4, G.12.6
6. Students will express an understanding of the science idea of friction as it relates to the preconceived notion of friction.
7. Students will demonstrate the ability to correctly apply the math necessary to solve physics problems.