

# Content Standard Science Standard A (Science Connections)

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

These themes relate and interconnect the Wisconsin science standards to one another. Each theme is further defined in the [Science Glossary](#).

## 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.

## Science Performance Standard A Grade 4

### Science, Standard A: Science Connections

#### Performance Standards - Grade 4

By the end of **grade four**, 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

## Science Performance Standard A Grade 8

### Science, Standard A: Science Connections

## Performance Standards - Grade 8

By the end of **grade eight**, students will:

- A.8.1 Develop their understanding of the science themes by using the themes to frame questions about science-related issues and problems
- A.8.2 Describe limitations of science systems and give reasons why specific science themes are included in or excluded from those systems
- A.8.3 Defend explanations and models by collecting and organizing evidence that supports them and critique explanations and models by collecting and organizing evidence that conflicts with them
- A.8.4 Collect evidence to show that models developed as explanations for events were (and are) based on the evidence available to scientists at the time
- A.8.5 Show how models and explanations, based on systems, were changed as new evidence accumulated (the effects of constancy, evolution, change, and measurement should all be part of these explanations)
- A.8.6 Use models and explanations to predict actions and events in the natural world
- A.8.7 Design real or thought investigations to test the usefulness and limitations of a model
- A.8.8. Use the themes of evolution, equilibrium, and energy to predict future events or changes in the natural world

## Science, Standard A: Science Connections Performance Standards - Grade 12

By the end of **grade twelve**, students will:

- A.12.1 Apply the underlying themes of science to develop defensible visions of the future
- A.12.2 Show how conflicting assumptions about science themes lead to different opinions and decisions about evolution, health, population, longevity, education, and use of resources, and show how these opinions and decisions have diverse effects on an individual, a community, and a country, both now and in the future
- A.12.3 Give examples that show how partial systems, models, and explanations are used to give quick and reasonable solutions that are accurate enough for basic needs
- A.12.4 Construct arguments that show how conflicting models and explanations of events can start with similar evidence
- A.12.5 Show how the ideas and themes of science can be used to make real-life decisions about careers, work places, life-styles, and use of resources
- A.12.6 Identify and, using evidence learned or discovered, replace inaccurate personal models and explanations of science-related events
- A.12.7 Re-examine the evidence and reasoning that led to conclusions drawn from investigations, using the science themes

# Content Standard Science Standard 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 with experimental evidence. This knowledge is public, replicable, and undergoing revision and refinement based on new experiments and data.

## Science Performance Standard B Grade 4

### **Science, Standard B: Nature of Science**

#### **Performance Standards - Grade 4**

By the end of **grade four**, 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

## Science Performance Standard B Grade 8

### **Science, Standard B: Nature of Science**

#### **Performance Standards - Grade 8**

By the end of **grade eight**, students will:

B.8.1 Describe how scientific knowledge and concepts have changed over time in the earth and space, life and environmental, and physical sciences

- B.8.2 Identify and describe major changes that have occurred over in conceptual models and explanations in the earth and space, life and environmental, and physical sciences and identify the people, cultures, and conditions that led to these developments
- B.8.3 Explain how the general rules of science apply to the development and use of evidence in science investigations, model-making, and applications
- B.8.4 Describe types of reasoning and evidence used outside of science to draw conclusions about the natural world
- B.8.5 Explain ways in which science knowledge is shared, checked, and extended, and show how these processes change over time
- B.8.6 Explain the ways in which scientific knowledge is useful and also limited when applied to social issues

## Science, Standard B: Nature of Science Performance Standards - Grade 12

By the end of **grade twelve**, students will:

- B.12.1 Show how cultures and individuals have contributed to the development of major ideas in the earth and space, life and environmental, and physical sciences
- B.12.2 Identify the cultural conditions that are usually present during great periods of discovery, scientific development, and invention
- B.12.3 Relate the major themes of science to human progress in understanding science and the world
- B.12.4 Show how basic research and applied research contribute to new discoveries, inventions, and applications
- B.12.5 Explain how science is based on assumptions about the natural world and themes that describe the natural world

## Content Standard Science Standard 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.

## Science Performance Standard C Grade 4

### Science, Standard C: Science Inquiry

#### Performance Standards - Grade 4

By the end of **grade four**, 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 safely and effectively, including rulers, balances, graduated cylinders, hand lenses, thermometers, and computers, 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, to display their answers

C.4.7 Support their conclusions with logical arguments

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

## Science, Standard C: Science Inquiry Performance Standards - Grade 8

By the end of **grade eight**, students will:

C.8.1 Identify\* questions they can investigate\* using resources and equipment they have available

C.8.2 Identify\* data and locate sources of information including their own records to answer the questions being investigated

C.8.3 Design and safely conduct investigations\* that provide reliable quantitative or qualitative data, as appropriate, to answer their questions

C.8.4 Use inferences\* to help decide possible results of their investigations, use observations to check their inferences

C.8.5 Use accepted scientific knowledge, models\*, and theories\* to explain\* their results and to raise further questions about their investigations\*

C.8.6 State what they have learned from investigations\*, relating their inferences\* to scientific knowledge and to data they have collected

- C.8.7 Explain\* their data and conclusions in ways that allow an audience to understand the questions they selected for investigation\* and the answers they have developed
- C.8.8 Use computer software and other technologies to organize, process, and present their data
- C.8.9 Evaluate\*, explain\*, and defend the validity of questions, hypotheses, and conclusions to their investigations\*
- C.8.10 Discuss the importance of their results and implications of their work with peers, teachers, and other adults
- C.8.11 Raise further questions which still need to be answered

## Science Inquiry Performance Standards C Grade 12

By the end of **grade twelve**, students will:

- C.12.1 When studying science content, ask questions suggested by current social issues, scientific literature, and observations\* of phenomena, build hypotheses that might answer some of these questions, design possible investigations\*, and describe results that might emerge from such investigations
- C.12.2 Identify\* issues from an area of science study, write questions that could be investigated\*, review previous research on these questions, and design and conduct responsible and safe investigations to help answer the questions
- C.12.3 Evaluate\* the data collected during an investigation\*, critique the data-collection procedures and results, and suggest ways to make any needed improvements
- C.12.4 During investigations\*, choose the best data-collection procedures and materials available, use them competently, and calculate the degree of precision of the resulting data
- C.12.5 Use the explanations\* and models\* found in the earth and space, life and environmental, and physical sciences to develop likely explanations\* for the results of their investigations\*
- C.12.6 Present the results of investigations\* to groups concerned with the issues, explaining\* the meaning and implications of the results, and answering questions in terms the audience can understand
- C.12.7 Evaluate\* articles and reports in the popular press, in scientific journals, on television, and on the Internet, using criteria related to accuracy, degree of error, sampling, treatment of data, and other standards of experimental design

## Content Standard Science Standard 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.

*Note: For more details of the content of physical sciences, see National Science Education Standards\* (1996, p. 115 - 201).*

### **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. Chemical reactions can be explained and predicted 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.

## **Science Performance Standard D Grade 4**

### **Science, Standard D: Physical Science**

#### **Performance Standards - Grade 4**

By the end of **grade four**, 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)

## Science, Standard D: Physical Science Performance Standards - Grade 8

By the end of **grade eight**, students will:

### PROPERTIES AND CHANGES OF PROPERTIES IN MATTER

D.8.1 Observe, describe, and measure physical and chemical properties of elements and other substances to identify and group them according to properties such as density, melting points, boiling points, conductivity, magnetic attraction, solubility, and reactions to common physical and chemical tests

D.8.2 Use the major ideas of atomic theory and molecular theory to describe physical and chemical interactions among substances, including solids, liquids, and gases

D.8.3 Understand how chemical interactions and behaviors lead to new substances with different properties

D.8.4 While conducting investigations, use the science themes to develop explanations of physical and chemical interactions and energy exchanges

### MOTIONS AND FORCES

D.8.5 While conducting investigations, explain the motion of objects by describing the forces acting on them

D.8.6 While conducting investigations, explain the motion of objects using concepts of speed, velocity, acceleration, friction, momentum, and changes over time, among others, and apply these concepts and explanations to real-life situations outside the classroom

D.8.7 While conducting investigations of common physical and chemical interactions occurring in the laboratory and the outside world, use commonly accepted definitions of energy and the idea of energy conservation

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### TRANSFER OF ENERGY

D.8.8 Describe and investigate the properties of light, heat, gravity, radio waves, magnetic fields, electrical fields, and sound waves as they interact with material objects in common situations

D.8.9 Explain the behaviors of various forms of energy by using the models of energy transmission, both in the laboratory and in real-life situations in the outside world

D.8.10 Explain how models of the atomic structure of matter have changed over time, including historical models and modern atomic theory



## Physical Science Performance Standards D Grade 12

By the end of **grade twelve**, students will:

### STRUCTURE OF ATOMS AND MATTER

D.12.1 Describe\* atomic structure and the properties of atoms, molecules, and matter during physical and chemical interactions\*

D12.2 Explain\* the forces that hold the atom together and illustrate\* how nuclear interactions\* change the atom

D.12.3 Explain\* exchanges of energy\* in chemical interactions\* and exchange of mass and energy in atomic/nuclear reactions

### CHEMICAL REACTIONS

D.12.4 Explain\* how substances, both simple and complex, interact\* with one another to produce new substances

D.12.5 Identify\* patterns in chemical and physical properties and use them to predict\* likely chemical and physical changes and interactions

D.12.6 Through investigations\*, identify\* the types of chemical interactions\*, including endothermic, exothermic, oxidation, photosynthesis, and acid/base reactions

### MOTIONS AND FORCES

D.12.7 Qualitatively and quantitatively analyze\* changes in the motion of objects and the forces that act on them and represent analytical data both algebraically and graphically

D.12.8 Understand\* the forces of gravitation, the electromagnetic force, intermolecular force, and explain\* their impact on the universal system

D.12.9 Describe\* models\* of light, heat, and sound and through investigations\* describe\* similarities and differences in the way these energy\* forms behave

### CONSERVATION OF ENERGY AND THE INCREASE IN DISORDER

D.12.10 Using the science themes\*, illustrate\* the law of conservation of energy\* during chemical and nuclear reactions

### INTERACTIONS OF MATTER AND ENERGY

D.12.11 Using the science themes\*, explain\* common occurrences in the physical world

D.12.12 Using the science themes\* and knowledge of chemical, physical, atomic, and nuclear interactions\*, explain\* changes in materials, living things, earth's features, and stars

## Content Standard Science Standard E - Earth and Space Science

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

*Note: For more details of the content of earth and space sciences, see National Science Education Standards\* (1996, p. 115 - 201).*

### **Rationale**

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

## **Science Performance Standard E Grade 4**

### **Science, Standard E: Earth and Space Science**

#### **Performance Standards - Grade 4**

By the end of **grade four**, 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 human resources use in mining, forestry, farming, and manufacturing in Wisconsin and elsewhere in the world

## Science, Standard E: Earth and Space Science Performance Standards - Grade 8

By the end of **grade eight**, students will:

### STRUCTURE OF EARTH SYSTEM

E.8.1 Using the science themes, explain and predict changes in major features of land, water, and atmospheric systems

E.8.2 Describe underlying structures of the earth that cause changes in the earth's surface

E.8.3 Using the science themes during the process of investigation, describe climate, weather, ocean currents, soil movements and changes in the forces acting on the earth

E.8.4 Using the science themes, analyze the influence living organisms have had on the earth's systems, including their impact on the composition of the atmosphere and the weathering of rocks

### EARTH'S HISTORY

E.8.5 Analyze the geologic and life history of the earth, including change over time, using various forms of scientific evidence

E.8.6 Describe through investigations the use of the earth's resources by humans in both past and current cultures, particularly how changes in the resources used for the past 100 years are the basis for efforts to conserve and recycle renewable and non-renewable resources

### EARTH IN THE SOLAR SYSTEM

E.8.7 Describe the general structure of the solar system, galaxies, and the universe, explaining the nature of the evidence used to develop current models of the universe

E.8.8 Using past and current models of the structure of the solar system, explain the daily, monthly, yearly, and long-term cycles of the earth, citing evidence gained from personal observation as well as evidence used by scientists

## Science, Earth and Space, Performance Standards E Grade 12

By the end of **grade twelve**, students will:

### ENERGY IN THE EARTH SYSTEM

E. 12.1 Using the science themes\*, distinguish between internal energies\* (decay of radioactive isotopes, gravity) and external energies (sun) in the earth's systems and show\* how these sources of energy have an impact on those systems

### GEOCHEMICAL CYCLES

E.12.2 Analyze\* the geochemical and physical cycles of the earth and use them to describe\* movements of matter

#### THE ORIGIN AND EVOLUTION OF THE EARTH SYSTEM

E.12.3 Using the science themes\*, describe\* theories of the origins and evolution\* of the universe and solar system, including the earth system\* as a part of the solar system, and relate\* these theories and their implications to geologic time on earth

E.12.4 Analyze\* the benefits, costs, and limitations of past, present, and projected use of resources and technology and explain\* the consequences to the environment

#### THE ORIGIN AND EVOLUTION OF THE UNIVERSE

E.12.5 Using the science themes\*, understand\* that the origin of the universe is not completely understood, but that there are current ideas in science that attempt to explain its origin

## Content Standard Science Standard 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.

*Note: For more details of the content of life and environmental sciences, see National Science Education Standards\* (1996, p. 115 - 201).*

### 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.

## Science, Life and Environmental, Performance Standards F Grade 4

By the end of **grade four**, 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 non-living things in various environments

## Science, Standard F: Life and Environmental Science Performance Standards - Grade 8

By the end of **grade eight**, students will:

#### STRUCTURE AND FUNCTION IN LIVING THINGS

F.8.1 Understand the structure and function of cells, organs, tissues, organ systems, and whole organisms

F.8.2 Show how organisms have adapted structures to match their functions, providing means of encouraging individual and group survival within specific environments

F.8.3 Differentiate between single-celled and multiple-celled organisms (humans) through investigation, comparing the cell functions of specialized cells for each type of organism

#### REPRODUCTION AND HEREDITY

F.8.4 Investigate and explain that heredity is comprised of the characteristic traits found in genes within the cell of an organism

F.8.5 Show how different structures both reproduce and pass on characteristics of their group

#### REGULATION AND BEHAVIOR

F.8.6 Understand that an organism is regulated both internally and externally

F.8.7 Understand that an organism's behavior evolves through adaptation to its environment

#### POPULATIONS AND ECOSYSTEMS

F.8.8 Show through investigations how organisms both depend on and contribute to the balance or imbalance of populations and/or ecosystems, which in turn contribute to the total system of life on the planet

#### DIVERSITY AND ADAPTATIONS OF ORGANISMS

F.8.9 Explain how some of the changes on the earth are contributing to changes in the balance of life and affecting the survival or population growth of certain species

F.8.10 Project how current trends in human resource use and population growth will influence the natural environment, and show how current policies affect those trends.

## Science Performance Standard F Grade 12

### Science, Standard F: Life and Environmental Science

#### Performance Standards - Grade 12

By the end of **grade twelve**, students will:

##### THE CELL

F.12.1 Evaluate the normal structures and the general and special functions of cells in single-celled and multiple-celled organisms

F.12.2 Understand how cells differentiate and how cells are regulated

##### THE MOLECULAR BASIS OF HEREDITY

F.12.3 Explain current scientific ideas and information about the molecular and genetic basis of heredity

F.12.4 State the relationships between functions of the cell and functions of the organism as related to genetics and heredity

##### BIOLOGICAL EVOLUTION

F.12.5 Understand the theory of evolution, natural selection, and biological classification

F.12.6. Using concepts of evolution and heredity, account for changes in species and the diversity of species, include the influence of these changes on science, e.g. breeding of plants or animals

##### THE INTERDEPENDENCE OF ORGANISMS

F.12.7 Investigate how organisms both cooperate and compete in ecosystems

F.12.8 Using the science themes, infer changes in ecosystems prompted by the introduction of new species, environmental conditions, chemicals, and air, water, or earth pollution

##### MATTER, ENERGY AND ORGANIZATION IN LIVING SYSTEMS

F.12.9 Using the science themes, investigate energy systems (related to food chains) to show how energy is stored in food (plants and animals) and how energy is released by digestion and metabolism

F.12.10 Understand the impact of energy on organisms in living systems

F.12.11 Investigate how the complexity and organization of organisms accommodates the need for obtaining, transforming, transporting, releasing, and eliminating the matter and energy\* used to sustain an organism

## THE BEHAVIOR OF ORGANISMS

F.12.12 Trace how the sensory and nervous systems of various organisms react to the internal and external environment and transmit survival or learning stimuli to cause changes in behavior or responses

# Content Standard Science Standard 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 compliment 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.

## Science, Standard G: Science Applications Performance Standards - Grade 4

By the end of **grade four**, 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, to make or repair things, or to move goods or people

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

## Science Applications, Performance Standards G Grade 8

By the end of **grade eight**, students will:

G.8.1 Identify\* and investigate\* the skills people need for a career in science or technology and identify the academic courses that a person pursuing such a career would need

G.8.2 Explain\* how current scientific and technological discoveries have an influence on the work people do and how some of these discoveries also lead to new careers

G.8.3 Illustrate\* the impact that science and technology have had, both good and bad, on careers, systems, society, environment, and quality of life

G.8.4 Propose a design (or re-design) 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 re-design) might work, including potential side-effects

G.8.5 Investigate\* a specific local problem to which there has been a scientific or technological solution, including proposals for alternative courses of action, the choices that were made, reasons for the choices, any new problems created, and subsequent community satisfaction

G.8.6 Use current texts, encyclopedias, source books, computers, experts, the popular press, or other relevant sources to identify\* examples of how scientific discoveries have resulted in new technology

G.8.7 Show\* evidence\* of how science and technology are interdependent, using some examples drawn from personally conducted investigations\*

## Science Performance Standard G Grade 12

### Science, Standard G: Science Applications

#### Performance Standards - Grade 12

By the end of **grade twelve**, students will:

G.12.1 Identify personal interests in science and technology, implications that these interests might have for future education, and decisions to be considered

G.12.2 Design, build, evaluate, and revise models and explanations related to the earth and space, life and environmental, and physical sciences

G.12.3 Analyze the costs, benefits, or problems resulting from a scientific or technological innovation, including implications for the individual and the community

G.12.4 Show how a major scientific or technological change has had an impact on work, leisure, or the home

G.12.5 Choose a specific problem in our society, identify alternative scientific or technological solutions to that problem and argue it merits

## Content Standard Science Standard H (Science in Personal and Social 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.

## Science, Standard H: Science in Personal and Social Perspectives Performance Standards - Grade 4

By the end of **grade four**, 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

## Science, Standard H: Science in Personal and Social Perspectives Performance Standards - Grade 8

By the end of **grade eight**, students will:

H.8.1 Evaluate the scientific evidence used in various media (for example, television, radio, Internet, popular press, and scientific journals) to address a social issue, using criteria of accuracy, logic, bias, relevance of data, and credibility of sources

H.8.2 Present a scientific solution to a problem involving the earth and space, life and environmental, or physical sciences and participate in a consensus-building discussion to arrive at a group decision

H.8.3 Understand the consequences of decisions affecting personal health and safety

## Science Performance Standard H Grade 12

### Science, Standard H: Science in Personal and Social Perspectives

#### Performance Standards - Grade 12

By the end of **grade twelve**, students will:

H.12.1 Using the science themes and knowledge of the earth and space, life and environmental, and physical sciences, analyze the costs, risks, benefits, and consequences of a proposal concerning resource management in the community and determine the potential impact of the proposal on life in the community and the region

H.12.2 Evaluate proposed policy recommendations (local, state, and/or national) in science and technology for validity, evidence, reasoning, and implications, both short and long-term

H.12.3 Show how policy decisions in science depend on social values, ethics, beliefs, and time-frames as well as considerations of science and technology

H.12.4 Advocate a solution or combination of solutions to a problem in science or technology

H.12.5 Investigate how current plans or proposals concerning resource management, scientific knowledge, or technological development will have an impact on the environment, ecology, and quality of life in a community or region

H.12.6 Evaluate data and sources of information when using scientific information to make decisions

H.12.7 When making decisions, construct a plan that includes the use of current scientific knowledge and scientific reasoning



