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.

	Performance Standards	Learning Targets	Assessments
A.8.1	Develop their understanding of the science themes by using the themes to frame questions about science-related issues and problems	5^{th} – 8^{th} Students will reinforce the mastery of Scientific Method: Inquiry of purpose, procedure, draw conclusions, observe, infer, communicate, classify, use variables, experiment, interpret data, make a model/ table, measure, use numbers and explore.	
A.8.2	Describe limitations of science systems and give reasons why specific science themes are included in or excluded from those systems	5^{th} – 8^{th} Students will reinforce the mastery of Scientific Method: Inquiry of purpose, procedure, draw conclusions, observe, infer, communicate, classify, use variables, experiment, interpret data, make a model/ table, measure, use numbers and explore.	

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	5^{th} – 8^{th} Students will reinforce the mastery of Scientific Method: Inquiry of purpose, procedure, draw conclusions, observe, infer, communicate, classify, use variables, experiment, interpret data, make a model/ table, measure, use numbers and explore.	
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	5^{th} – 8^{th} Through labs and experiments students will collect evidence as a means of explanations for events.	
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 explanations	5^{th} – 8^{th} Through labs and experiments students will analyze evidence and draw conclusions.	
A.8.6	Use models and explanations to predict actions and events in the natural world	5^{th} – 8^{th} Students will reinforce the mastery of Scientific Method: Inquiry of purpose, procedure, draw conclusions, observe, infer, communicate, classify, use variables, experiment, interpret	

		data, make a model/ table, measure, use numbers and explore.	
A.8.7	Design real or thought investigations to test the usefulness and limitations of a model	5^{th} – 8^{th} Students will reinforce the mastery of Scientific Method: Inquiry of purpose, procedure, draw conclusions, observe, infer, communicate, classify, use variables, experiment, interpret data, make a model/ table, measure, use numbers and explore.	
A.8.8	Use the themes of evolution, equilibrium, and energy to predict future events or changes	5^{th} – 8^{th} Students will reinforce the mastery of science themes by utilizing inquiry, investigation through structured, guided and independent inquiry	

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.

B.8.1	Describe how scientific knowledge and concepts have changed over time in the earth and space, life and environmental, and physical sciences	5^{th} – 8^{th} Students will compare and contrast current and past scientific concepts with present day information.	

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	5^{th} – 8^{th} Students will reinforce mastery of the use of internet resources, Time for Kids (5^{th} grade), guest speakers, newspapers, magazines, and journals to acquire information about scientific 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	5^{th} – 8^{th} Students will reinforce the mastery of Scientific Method: Inquiry of purpose, procedure, draw conclusions, observe, infer, communicate, classify, use variables, experiment, interpret data, make a model/ table, measure, use numbers and explore.	
B.8.4	Describe types of reasoning and evidence used outside of science to draw conclusions about the natural world	5^{th} – 8^{th} Students will incorporate the use of internet resources, *Time for Kids* (Currently used by 5^{th} grade), guest speakers, newspapers, magazines, and journals 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	5^{th} – 8^{th} Students will reinforce mastery of the use of internet resources, *Time for Kids* (Currently used by 5^{th} grade), guest speakers, newspapers, magazines, and journals to explain how scientific knowledge is shared, checked and extended to 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	6th and 8th Students will participate in a drug and alcohol unit and discuss the influence media has on society. Students discuss myth verses facts and peer pressure. 7th Students will, within units, discuss the effects of drugs and alcohol on studied body systems.	
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.			
C.8.1	Identify* questions they can investigate* using resources and equipment they have available	5th Students will be introduced to lab experiments utilizing lab templates (Scientific Process listed) during labs. 6th – 8th Students will follow the Scientific Method (PHEOC) during all labs. Multiple labs will be utilized to reinforce content area.	
C.8.2	Identify* data and locate sources of information including their own records to answer the questions	5th Students will utilize Scientific Method during a lab. Template used to collect, record, and analyze data to answer lab problem and determine if hypothesis is correct.	

	being investigated	6th – 8th Students will utilize PHEOC during a lab. Collect, record, and analyze data to answer lab problem and determine if hypothesis is correct.	
C.8.3	Design and safely conduct investigations* that provide reliable quantitative or qualitative data, as appropriate, to answer their questions	5th Instructor will review safety tips prior to each lab. Students will conduct, observe and record data to prove or disprove their hypothesis. 6th – 8th Students will complete a safety unit, safety quiz, and sign a safety contract. Students will conduct, observe and record data to prove or disprove their hypothesis.	
C.8.4	Use inferences* to help decide possible results of their investigations, use observations to check their inferences	5th – 8th Students will be given a problem and infer possible results to create a possible hypothesis.	
C.8.5	Use accepted scientific knowledge, models*, and theories* to explain* their results and to raise further questions about their investigations*	5th – 8th Students will utilize accepted scientific knowledge and theories to explain their results and to raise further questions about their investigations. Students will utilize 2D and 3D models 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	5th – 8th Students will analyze data to draw conclusions from data/observations collected during an investigation. Students will formulate a comprehensive conclusion that includes a determination that supports or disproves a hypothesis.	
C.8.7	Explain* their data and conclusions in ways	5th – 8th Students will explain data and conclusions from	

	that allow an audience to understand the questions they selected for investigation* and the answers they have developed	data/observations collected during an investigation while keeping audience in mind.	
C.8.8	Use computer software and other technologies to organize, process, and present their data	5^{th} – 8^{th} Students will utilize computer software to create graphs, record data, and share information. Students will utilize other technologies to demonstrate, communicate, and/or reinforce knowledge.	
C.8.9	Evaluate*, explain*, and defend the validity of questions, hypotheses, and conclusions to their investigations*	5^{th} – 8^{th} Students will analyze data to draw conclusions from data/observations collected during an investigation. Students will formulate a comprehensive conclusion that includes a determination that supports or disproves a hypothesis and state knowledge gained.	
C.8.10	Discuss the importance of their results and implications of their work with peers, teachers, and other adults	5^{th} – 8^{th} Through classroom discussion students will relate concepts to real life applications.	
C.8.11	Raise further questions which still need to be answered	5^{th} – 8^{th} Through classroom discussion and various forms of media students will be able to raise further questions which still need to be answered.	

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**.**			
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	5th - Students will define and label the water cycle. - Students will define conduction and convection of heat. 6th -Students will be able to define and classify matter based on physical and chemical properties. - Students define and differentiate between physical properties of density, length, volume, mass, density, color, and texture. -Students will describe phases of matter and distinguish among solid, liquid, and gas including freezing, melting, and boiling points. 7th - Students will be able to measure physical properties of various objects. - Students will define and solve for density.	

		8th -Students will test and predict conductivity within elements of the Periodic Table. - Students will be able to identify test and predict magnetic attraction to different elements and materials. - Students will test and predict solubility among element. - Students will test and predict common physical and chemical reactions.	
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	6th - Students will label the parts of an atom. 8th - Students will define the atomic theory, make-up of atoms and subatomic particles, alpha, beta and gamma. - Students will define the molecular theory, combining and balancing of chemical reactions.	
D.8.3.	Understand how chemical interactions and behaviors lead to new substances with different properties	6th Students will be introduced to the Periodic Table: groups, period, atomic number, mass, chemical symbol, elements, protons, neutrons 8th Students will continue using the Periodic Table as a tool to expand on group and period knowledge, energy level and outer valance.	
D.8.4	While conducting investigations, use the science themes to develop explanations of physical and chemical interactions and energy exchanges	8th Students will continue using the Periodic Table as a tool to expand on group and period knowledge, physical and chemical interaction, energy level and outer valance.	

D.8.5	While conducting investigations, explain the motion of objects by describing the forces acting on them	5th Students will experiment and demonstrate understanding of friction, resistance, effort force, and gravity. 6th Students will experiment and demonstrate understanding of thrust, lift, gravity, and drag (As related to forces of flight). 7th Students will experiment and demonstrate understanding of Newton's Laws, gravity, centripetal force, pressure, and buoyancy.	
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	5th Students will experiment and demonstrate understanding of friction, resistance, effort force, gravity, potential energy, and kinetic energy. 6th Students will experiment and demonstrate understanding of thrust, lift, gravity, and drag (As related to forces of flight). 7th Students will experiment and demonstrate understanding of Newton's Laws, gravity, centripetal force, pressure, and buoyancy. 8th Students will experiment and demonstrate understanding of potential and kinetic energy.	
D.8.7	While conducting investigations of common physical and chemical interactions occurring in the laboratory and the outside world, use	5th Students will experiment and demonstrate understanding of potential and kinetic energy. 7th Students will experiment and demonstrate understanding of potential and kinetic energy.	

	commonly accepted definitions of energy and the idea of energy conservation	8th Students will experiment and demonstrate understanding of potential and kinetic energy, reaction of metal, metalloid, and non-metals.	
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	5th Students will experiment and demonstrate understanding of gravity. 6th Students will experiment and demonstrate understanding of properties of light, sound waves, and opaque and translucent materials. 7th Students will experiment and demonstrate understanding of gravity with respect to forces. 8th Students will experiment and demonstrate understanding of radio waves, magnetic fields, electrical fields, sound waves, transverse waves, and longitudinal waves.	
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	5th Students will experiment and demonstrate understanding of potential and kinetic energy, radiation, conduction, and convection. 6th Students will experiment and demonstrate understanding of reflection, refraction, and absorption of light. 7th Students will experiment and demonstrate understanding of forces, action/reaction with the transfer of energy, and radiation of atmosphere. 8th	

		Students will experiment and demonstrate understanding of potential and kinetic energy, and radiation.	
D.8.10	Explain how models of the atomic structure of matter have changed over time, including historical models and modern atomic theory	8th Students will discuss the history of atoms and the different types of models as compared to the current model.	
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.			
E.8.1	Using the science themes, explain and predict changes in major features of land, water, and atmospheric systems	5th Students will demonstrate understanding of water cycle through discussion and diagramming. 7th Students will discuss and demonstrate understanding of Earth forces, rock cycle, and atmosphere. 8th Students will demonstrate understanding of water cycle	

		through discussion and diagramming.	
E.8.2	Describe underlying structures of the earth that cause changes in the earth's surface	7th Students will discuss and demonstrate understanding of Earth forces, plate tectonics, volcanoes, and earthquakes.	
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	7th Students will discuss and demonstrate understanding of climate, soil movements, rocks weathering and erosion, how ocean currents affect erosions, trade winds, global winds. 8th Students will discuss and demonstrate understanding of clouds, high and low pressure systems, surface map, severe weather, relative humidity, precipitation, air masses, fronts, station model, and water cycle.	
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	5th Students will discuss human impact on ecosystems. Students will discuss and demonstrate understanding of decomposition. 6th Students will discuss and evaluate the validity of the Global Warming theory. 7th Students will discuss and demonstrate understanding of weathering of rocks, composition of atmosphere, pollution, ozone layer. Students will discuss the Global Warming theory.	
E.8.5	Analyze the geologic and life history of the earth, including change	5th Students will discuss the Big Bang Theory.	

	over time, using various forms of scientific evidence	7th Students will discuss and demonstrate understanding of Pangea – plate movement.	
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	5th Students will discuss greener lifestyles and choices. 6th Students will compare and contrast energy options: coal, oil, hydroelectric, geothermal, wind, and nuclear.	
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	5th Students will discuss and demonstrate understanding of the structure of the Milky Way solar system, types of galaxies, the universe, and current and past models of the universe. 8th Students will research a part of the solar system and create a technology-based presentation.	
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	5th Students will discuss and demonstrate understanding of past and current models of the structure of the solar system, and daily, monthly, yearly, and long-term orbits of the planets.	

	observation as well as evidence used by scientists		
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.			
F.8.1	Understand the structure and function of cells, organs, tissues, organ systems, and whole organisms	5th Students will discuss and demonstrate understanding of the structure and function of the plant and animal cell. 6th Students will demonstrate understanding of eye and ear as relates to sight and hearing. 7th Students will discuss and demonstrate understanding of the heart, lungs, brain, nervous system, respiratory system, and circulatory system. 8th Students will discuss and demonstrate understanding of cells through a 3D model and presentation.	

F.8.2	Show how organisms have adapted structures to match their functions, providing means of encouraging individual and group survival within specific environments	5th Students will discuss how seeds and plants adapt to meet needs of their habitat. 6th Students will discuss and demonstrate understanding of the eye and ear. 7th Students will discuss and demonstrate understanding of the heart, lungs, brain, nervous system, respiratory system, and circulatory system. 8th Students will discuss and demonstrate understanding of heredity and genetics.	
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	7th Students will discuss and demonstrate the difference between single cell and complex organisms pertaining to the respiratory system. 8th Students will discuss and demonstrate understanding of specialized cells through a 3D model and presentation.	
F.8.4	Investigate and explain that heredity is comprised of the characteristic traits found in genes within the cell of an organism	8th Students will 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	5th Students will discuss and demonstrate understanding of asexual and sexual reproduction of plants.	

	group	8th Students will discuss and demonstrate how different structures both reproduce and pass on characteristics of their group.	
F.8.6	Understand that an organism is regulated both internally and externally	5th Students will discuss and demonstrate understanding of plants transpiration.	
F.8.7	Understand that an organism's behavior evolves through adaptation to its environment	5th Students will discuss and demonstrate understanding of how seeds and plants adapt to meet needs of environment living in. 6th Students will discuss and demonstrate understanding of eye and ear. 7th Students will discuss and demonstrate understanding of heart, lungs, brain, nervous system, respiratory system, and circulatory system. 8th Students will discuss and demonstrate understanding of heredity and genetics.	
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	5th Students will discuss and demonstrate understanding of the life cycle, parasitism, commensalism, and mutualism.	

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	5th Students will discuss and demonstrate understanding of the destruction of habitation and deforestation. 6th Students will discuss and demonstrate understanding of Global Warming impact on organisms. 7th Students will discuss and demonstrate understanding of Global Warming and its effect on the atmosphere.	
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.	5th – 8th Not covered.	
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.			
G.8.1	Identify* and investigate* the skills people need for a career in science or	8th Students will view a career video during science class. During 8th grade careers class students will explore science careers that they are interested in.	

	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	5th Students will discuss and demonstrate understanding of telescopes and how they have evolved. 8th Students will discuss and demonstrate how one technology builds on another and inquiry project: investigation of a product.	
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	8th Students will discuss and demonstrate how technology has impacted change.	
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	5th Students will discuss and create an invention. (Currently through *Time For Kids*) 6th Students will design and construct model airplanes; fuel consumption is discussed.	
G.8.5	Investigate* a specific	6th	

	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	Menominee Tribal Enterprises representative discusses with students the need of forest conservation for a balanced ecosystem.	
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	6th Students will research the contributions and reason for immigration to the United States of an immigrant scientist. 7th Students will research a science topic to create an article for Deadline project. 8th Students will select an inquiry project to research, write a research paper, deliver a speech and create a visual aid.	
G.8.7	Show* evidence* of how science and technology are interdependent, using some examples drawn from personally conducted investigations*	8th Through the investigation of self-selected inquiry project, students will give evidence of how science and technology are interdependent.	
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.

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	6^{th} and 8^{th} Students will participate in a drug and alcohol unit and discuss the influence media has on society. Students discuss myth verses facts and peer pressure.	
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	5^{th} Students will research and develop a bill proposal, debate its worth and vote whether it should become a law. 6^{th} Students will research the traits of living organisms. Students will compare traits of viruses and decide if they should be considered a living organism.	

H.8.3	Understand the consequences of decisions affecting personal health and safety	5th Students will participate in an internet safety curriculum. (Currently using NetSmartz) 6th Students will participate in a drug and alcohol unit and discuss the influence media has on society. Students discuss myth verses facts and peer pressure. Students will participate in an internet safety curriculum. (Currently using NetSmartz) 7th Students will discuss and understand the effect of drugs and alcohol on studied body systems. 8th Students will participate in a drug and alcohol unit and discuss the influence media has on society. Students discuss myth verses facts and peer pressure.	