

Science in Personal and Social Perspectives

Content Standard F:

As a result of the activities in grades K-4, all students should develop an understanding of

- Personal health
- Characteristics and changes in populations
- Types of resources
- Changes in environments
- Science and technology in local challenges



Content Summary

National Science Education Content Standards	K-4	<p>Personal health</p> <p>Characteristics and changes in populations</p> <p>Types of resources</p> <p>Changes in environments</p> <p>Science and technology in local challenges</p>
	5-8	<p>Personal Health</p> <p>Population, resources, and environments</p> <p>Natural hazards</p> <p>Risks and benefits</p> <p>Science and technology in society</p>
	9-12	<p>Personal and community health</p> <p>Population growth</p> <p>Natural resources</p> <p>Natural and human induced hazards</p> <p>Science and technology in local, national and global challenges</p>

Minnesota Graduation Standards	Primary Level	<p>Personal Health and Fitness:</p> <p>Understand and participate in activities that promote personal fitness, health, nutrition and safety</p>
	Intermediate Level	<p>Personal Health and Nutrition:</p> <p>Use a decision-making model to promote personal health, nutrition and safety</p> <p>Writing:</p> <p>Write for a variety of academic and technical purposes and audiences</p> <p>Geography and Citizenship:</p> <p>Understand the interaction of people, places and locations</p>
	Middle Level	<p>Personal Health:</p> <p>Make informed decisions based on information to promote personal health and nutrition</p> <p>Current Issue Analysis:</p> <p>Defend a position concerning a current event or issue</p> <p>Nonfiction Reading, Viewing and Listening:</p> <p>Comprehend, interpret and evaluate information from a variety of non-fiction formats in reading, viewing and listening</p>
	High School Level	<p>Environmental Systems:</p> <p>Apply scientific methods to issues involving relationships among the individual, the society, the economy and the environment</p> <p>Natural/Managed Systems:</p> <p>Understand the interaction and interdependence of natural and managed systems</p> <p>Academic Writing:</p> <p>Demonstrate the ability to write for a variety of academic purposes and situations</p> <p>Issue Analysis:</p> <p>Research an issue and evaluate proposed positions or solutions</p> <p>Individuals and Community Health:</p> <p>Make informed decisions that enhance individuals, family and community health</p> <p>Human Geography:</p> <p>Understand how cultures interact with their environments</p>

Focus K-12

Grade	Early	Late
K-4	The focus of instruction early in this grade range is on providing opportunities for all students to develop initial understandings about the relationships between science, personal health, and the environment.	The focus of instruction later in this grade range is on providing opportunities for all students to develop understandings about science-related personal and societal challenges and engage in some personal actions in local challenges related to science and technology.
5-8	The focus of instruction early in this grade range is on providing opportunities for all students to develop a more conceptual understanding of science-related social issues, make connections, and engage in actions related to science and personal and social challenges in their community.	The focus of instruction for all students later in this grade range is on developing a scientific understanding of health and enabling students to make reasoned decisions and take relevant actions in personal and community challenges related to science, technology, and society.
9-12	The focus of instruction for all students at the high school level is on improving all students' scientific understandings of science, technology, and societal challenges, how they interact, and on developing their abilities to evaluate the consequences of associated actions or decisions.	The focus of instruction for students pursuing further study is on providing support for students as they engage in personal actions and inform and persuade others to make appropriate decisions relating to personal, community, and global actions.

Close-up K-4

The focus of instruction early in this grade range is on providing all students opportunities to develop initial understandings about the relationships between science, personal health, and the environment.

Through a variety of experiences, students begin to understand the relationship between science and personal health. Students understand the connection between food and their own growth, health, and energy and that some foods are nutritionally better for them than others. Students are able to understand the importance of washing their hands to prevent the spread of “germs” but they are not able to distinguish between contagious and non-contagious diseases or understand the origin or prevention of diseases. Students begin to identify resources from living and non-living environments and learn how these resources meet their needs and wants. They understand that some resources occur naturally, while others are human made. As students participate in projects such as recycling materials in their classroom, school, and home, they begin to understand that some resources are limited. Students build on their experiences in life science to learn how humans change the environment and the effects of these changes. Students begin to investigate and discuss how science and technology have improved transportation, health, sanitation, and communication. Students and teachers observe established science safety procedures.

The focus of instruction later in this grade range is on providing opportunities for all students to develop understandings about science-related personal and societal challenges and engage in some personal actions in local challenges related to science and technology.

Students have opportunities to examine factors that are important to their own health, such as the importance of exercise, diet, and a safe environment for healthy development. They are able to link hygiene to good health but are not able to understand the origins of diseases, resistance to infection, or prevention and cure of diseases. They are introduced to the idea that substance abuse affects the human body. They recognize that many resources are limited but can be extended through recycling and/or decreased use. They become increasingly aware that changes in the environment can be natural or influenced by humans and that such changes have consequences. Students are able to engage in some personal actions in local challenges related to science and technology such as recycling and consumer practices. They investigate how science and technology have affected people in both positive and negative ways. Students also learn that technological advances are not available to all the people in the world. Students and teachers observe established science safety procedures.

On Location K-4

This activity relates to the characteristics of and changes in populations, correlated with change in the environment over time. It is embedded in a unit dealing with flowering plants. Because it is a long-term undertaking, students learn about the nature of science. One of the big benefits of an ongoing study is an expanded data base, and an opportunity for students to engage in real scientific activity.

Ms. C's fourth graders are participating in an ongoing research project on purple loosestrife competition with cattails in a nearby marsh. Purple loosestrife is posing a significant risk to ecosystems in Minnesota wetlands because it has no natural enemies and aggressively crowds out natural vegetation required by native wildlife. Students are excited about being part of a possible solution to a real problem in their community.

Students stake off three areas of a nearby marsh. In one area they pick off loosestrife seed heads and in another, they physically remove the entire loosestrife plants. The third site is left alone and serves as a control. Students destroy all of the loose-strife seeds and plants that they harvest. Students then count cattail plants and observe animal life at each site in the cattail marsh. They record data in laboratory notebooks and later store their data on computer templates designed especially for this project. Working with their teachers, students analyze their data and make predictions from it.

While participating in the research project, students grow plants other than loosestrife in their classroom to learn the cycle of flowering plants from seed to seed. As they develop an understanding of the role of seeds in propagating plants, they use these learnings to make predictions as to what will happen in their sites in the spring.

During the winter months, a naturalist from a local nature center visits classes. She brings illustrations of state marshes over time that illustrate how loosestrife replaces other marsh plants such as cattails. The naturalist is able to show children long term effects on animal populations as well as those that depend upon marsh animals for food. This introduces the concepts of interdependence and food chains.

The next spring, the students go back to their sites in the marsh to count cattail and loosestrife plants and record observations of the animal life that are present there. Back in the classroom, the students analyze their data to determine whether removing flowers from loosestrife plants has any effects. They use lab books, journals, and computer files that are kept from year to year to make comparisons with the data they collect. The students produce a display of their work and share their data with scientists and others in the community.

National Science Education Content Standards

K-4 Content Standard F

Personal Health

- Safety and security are basic needs of humans. Safety involves freedom from danger, risk, or injury. Security involves feelings of confidence and lack of anxiety and fear. Student understandings include following safety rules for home and school, preventing abuse and neglect, avoiding injury, knowing whom to ask for help, and when and how to say no.
- Individuals have some responsibility for their own health. Students should engage in personal care—dental hygiene, cleanliness, and exercise—that will maintain and improve health. Understandings include how communicable diseases, such as colds, are transmitted and some of the body's defense mechanisms that prevent or overcome illness.
- Nutrition is essential to health. Students should understand how the body uses food and how various foods contribute to health. Recommendations for good nutrition include eating a variety of foods, eating less sugar, and eating less fat.
- Different substances can damage the body and how it functions. Such substances include tobacco, alcohol, over-the-counter medicines, and illicit drugs. Students should understand that some substances, such as prescription drugs, can be beneficial, but that any substance can be harmful if used inappropriately.

Characteristics and Changes in Populations

- Human populations include groups of individuals living in a particular location. One important characteristic of a human population is the population density—the number of individuals of a particular population that lives in a given amount of space.
- The size of a human population can increase or decrease. Populations will increase unless other factors such as disease or famine decrease the population.

Types of Resources

- Resources are things that we get from the living and nonliving environment to meet the needs and wants of a population.
- Some resources are basic materials, such as air, water, and soil; some are produced from basic resources, such as food, fuel, and building materials; and some resources are nonmaterial, such as quiet places, beauty, security, and safety.
- The supply of many resources is limited. If used, resources can be extended through recycling and decreased use.

Changes in Environments

- Environments are the space, conditions, and factors that affect an individual's and a population's ability to survive and their quality of life.
- Changes in environments can be natural or influenced by humans. Some changes are good, some are bad, and some are neither good nor bad. Pollution is a change in the environment that can influence the health, survival, or activities of organisms, including humans.
- Some environmental changes occur slowly, and others occur rapidly. Students should understand the different consequences of changing environments in small increments over long periods as compared with changing environments in large increments over short periods.

Science and Technology in Local Challenges

- People continue inventing new ways of doing things, solving problems, and getting work done. New ideas and inventions often affect other people; sometimes the effects are good and sometimes they are bad. It is helpful to try to determine in advance how ideas and inventions will affect other people.
- Science and technology have greatly improved food quality and quantity, transportation, health, sanitation, and communication. These benefits of science and technology are not available to all of the people in the world.

Minnesota Graduation Standards

Primary Level

Personal Health and Fitness:

Understand and participate in activities that promote personal fitness, health, nutrition and safety.

What students should do:

1. Show evidence of healthy choices in real or simulated situations:
 - a. interpersonal conflict
 - b. proper care of the body
 - c. nutrition
 - d. safety (e.g., bicycle, water, poison, pedestrian)
 - e. drugs, tobacco and alcohol
 - f. exercise and recreation
2. Show evidence of work to improve physical fitness as assessed by:
 - a. age-appropriate National Fitness Standards
 - b. participation in a daily fitness plan
 - c. demonstration of motor skills required for individual and team activities
 - d. appropriate competitive and cooperative participation in physical education activities

In Addition:

Activities outside of the school setting may be documented as part of the performance task.

