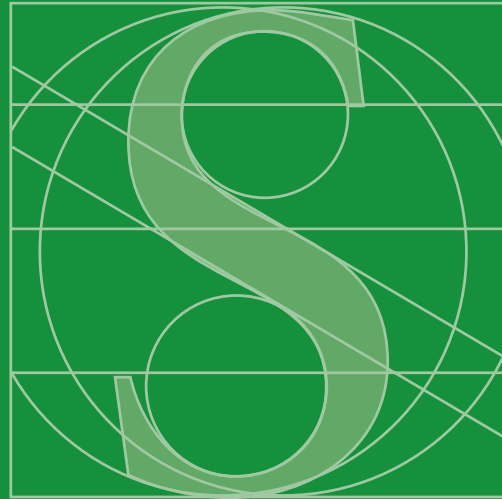


# History and Nature of Science

**Content Standard G:**

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

- Science as a human endeavor



# Content Summary

National Science Education Content Standards	<b>K-4</b>	<p><b>Science as a human endeavor</b></p>
	<b>5-8</b>	<p><b>Science as a human endeavor</b></p> <p><b>Nature of science</b></p> <p><b>History of science</b></p>
	<b>9-12</b>	<p><b>Science as a human endeavor</b></p> <p><b>Nature of scientific knowledge</b></p> <p><b>Historical perspectives</b></p>

Minnesota Graduation Standards	<b>Primary Level</b>		<b>Intermediate Level</b>	<p><b>Historical Events:</b> Understand historical events and contributions of key people from different time periods</p>	<b>Middle Level</b>	<p><b>Career Exploration:</b> Explore career and education options to make informed decisions for future life choices</p>	<b>High School Level</b>	<p><b>History of Science:</b> Understand the interaction between social, economic, technological, and/or environmental factors and the occurrence of scientific advances</p> <p><b>Cultures Across Time:</b> Understand the significance of events and themes across cultures and time</p>
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## Focus K-12

Grade	Early	Late
<b>K-4</b>	The focus of instruction for all students early in this grade range is on developing an awareness that science is something that students do and relating that to what scientists do.	The focus of instruction for all students later in this grade range is on developing an understanding that science is an ongoing process and that many men and women are involved in the advancement of scientific understandings.
<b>5-8</b>	The focus of instruction early in this grade range is on providing all students opportunities to understand the nature of science by examining their own inquiry investigations and historical examples.	The focus of instruction for all students later in this grade range is on using student investigations, case studies, and historical examples from a variety of cultures to help students understand scientific inquiry, the nature of scientific knowledge, and interactions between science and society.
<b>9-12</b>	The focus of instruction for all students at the high school level is on using historical examples to understand the human dimension of science and technology, the nature of scientific knowledge, and the enterprise of science and technology in a variety of historical and cultural perspectives.	The focus of instruction for students pursuing further study is on providing opportunities for students to analyze and replicate historical and contemporary scientific investigations and explore their cultural and historical implications.

## Close-up K-4

The focus of instruction for all students early in this grade range is on developing an awareness that science is something that students do and relating that to what scientists do.

Students learn about the history and nature of science through their own investigations and conversations about them. Through stories, films, videos, photographs, and discussion with guest scientists and people who use science in their work, students learn that science is done by a great variety of men and women. Students and teachers observe established science safety procedures.

The focus of instruction for all students later in this grade range is on developing an understanding that science is an ongoing process and that many men and women are involved in the advancement of scientific understandings.

Students learn about scientists in a variety of ways and share the results of their learning. Organizations such as NASA, local science-based businesses, and science organizations can be contacted for posters, information about and pictures of scientists, and classroom speakers. Through discussions about how scientists work, the materials they use, and how these are related to what students do in their investigations, students begin to understand that science is a human endeavor. Students and teachers observe established science safety procedures.

# On Location K-4

*Throughout the school year Ms. E's first graders participate in a variety of inquiry activities both in and out of the classroom. Prior to this activity, her students have had multiple experiences looking at properties of objects and sorting and classifying them.*

*This activity sets the stage for connecting what they are learning and doing to activities that scientists do.*

"What is science?" Ms. E asks her students. After some thoughtful, quiet thinking, most students respond with "I don't know" or declare that science is something big people do. One student recalls that there was a science table in kindergarten, but can't remember what they actually did there. Noticing that her students are struggling with the vagueness of this question, she asks, "What do you call a person who does science?" The unanimous answer is "A scientist!"

"Well," she continues, walking over to the board, "What does a scientist do?" Many students raise their hands and some begin shouting out answers. "They study animals!" "They study dinosaurs!" "They study tornadoes!" "They study volcanoes!" To reinforce the use of the word scientist, Ms. E writes and says, "Scientists study dinosaurs." After a while the students pick up the pattern and offer "Scientists study chemicals," and "Scientists study people."

Probing further, Ms. E asks, "What does 'study' mean?" The children are quiet for a while until one student ventures, "They, I mean scientists, find out about things." In a flash, students offer answers until the paper is filled with statements such as "Scientists mix stuff together," "Scientists look closely at things," "Scientists go places to find out about things," and "Scientists read about things." Underlining the phrase 'look closely', she asks them to think about what it means to look closely, eventually introducing the word 'observe.' "How do scientists remember what they observe?" she asks. The students offer ideas such as video taping, writing about, and drawing what they see.

The students then don an old sock over one of their shoes and go for a walk outside.

When the students return, they use a hand lens to 'look closely', sort, and identify what they gathered on their one sock walk. Calling them back to their original list about scientists, Ms. E asks, "How are we like scientists?" A spirited discussion follows about how they 'study' what they have found on their socks and 'look closely' using tools like a hand lens.

"What questions do we have about what we found?" There is an uproar as students shout out questions. "Is this a seed?" "Will it grow?" "Why did they stick to our socks?" "Would I find the same stuff if I walked in my backyard?" "Why are they all brown and gray?" Once again, Ms. E brings them back to their discussions about what scientists do. She asks, "How do scientists know what to study?" After a lively discussion, the students decide that scientists "look closely and ask lots and lots of questions." Ms. E notes, "Just like us!" and the students begin investigations of their questions.



# National Science Education Content Standards

## K-4 Content Standard G

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**Science as  
a Human  
Endeavor**

- Science and technology have been practiced by people for a long time.
- Men and women have made a variety of contributions throughout the history of science and technology.
- Although men and women using scientific inquiry have learned much about the objects, events, and phenomena in nature, much more remains to be understood. Science will never be finished.
- Many people choose science as a career and devote their entire lives to studying it. Many people derive great pleasure from doing science.

