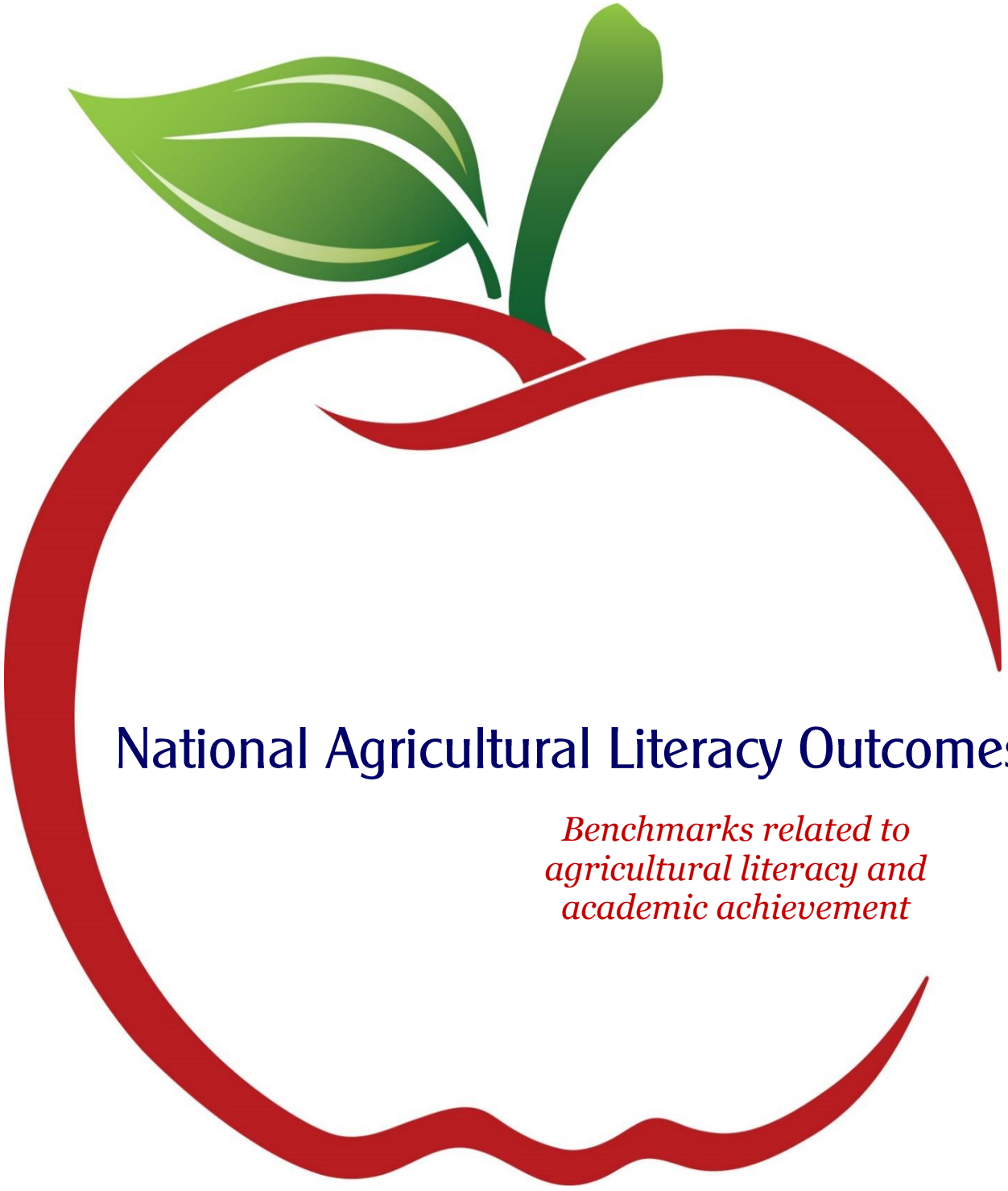

# National Agricultural Literacy Outcomes

*Benchmarks related to agricultural literacy and academic achievement*

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# Foreword

We are a nation that has reaped the benefits of a successful agricultural system. This has allowed our society to flourish, engage in leisure activities, and dream about future endeavors. Our successful innovations concerning food and fiber has resulted in fewer farmers and larger yields. However, this success story has come with a consequence—a society that has little understanding concerning agricultural production and processing, and how this system meets our basic needs (food, clothing, shelter), and relates or interacts with a sustainable environment and our quality of life. Daily decisions made by individuals, through dollars and voting, affect our agricultural system—from soil to spoon. If U.S. agriculture is going to continue to meet the needs of the U.S. population and address growing global needs, agriculture needs to be understood and valued by all.

An agriculturally literate person has been defined by the National Research Council (1988) as a person who "understand[s] the food and fiber system and this would include its history and its current economic, social and environmental significance to all Americans" (p. 8). This definition was expanded through dissertation research and published subsequently by Frick, Martin, Kahler, and Miller (1991). Based on a survey of agricultural educators at land-grant universities, these researchers refined the definition of agricultural literacy. Their resulting definition stated that:

> Agricultural literacy can be defined as possessing knowledge and understanding of our food and fiber system. An individual possessing such knowledge would be able to synthesize, and analyze, and communicate basic information about agriculture. Basic agricultural information includes the production of plant and animal products, the economic impact of agriculture, its societal significance, agriculture's important relationship with natural resources and the environment, the marketing of agricultural products, the processing of agricultural products, public agricultural policies, the global significance of agriculture, and the distribution of agricultural products. (p. 52)

Over the years scholars have moved away from knowledge-based understanding of agriculture to include "…broader environmental and global social significance. More recently, there have been efforts to define agricultural literacy in terms of conversational knowledge, critical analysis, and value-based judgment" (Powell, Agnew & Trexler, 2008, p. 88). Trexler (2000) clarified conversational literacy as "culturally based beliefs, values and attitudes" resulting in "the ability to make judgments based on culturally based norms" (p. 43). Trexler's use of "culturally-based norms" is reflected in society's engagement with agriculture.

In an effort to capture these agricultural literacy constructs, researchers, practitioners, and government officials convened in Washington, D.C., on April 17, 2013, to develop a National Agricultural Literacy Logic Model (Spielmaker, Pastor & Stewardson, 2014). To support this model, an agriculturally literate person was defined as "A person who understands and can communicate the source and value of agriculture as it affects our quality of life" (National Agriculture in the Classroom, 2014). This definition, along with previously developed frameworks, shaped the development of the National Agricultural Literacy Outcomes (NALOs).

A synthesis of influential research and published agricultural literacy frameworks (American Farm Bureau Foundation for Agriculture, 2012; Food, Land & People, 2012; Leising, Igo, Heald, Hubert & Yamamoto, 1998) resulted in the development of five themes:

- Agriculture and the Environment
- Plants and Animals for Food, Fiber & Energy
- Food, Health, and Lifestyle
- Science, Technology, Engineering & Math
- Culture, Society, Economy & Geography

The outcomes have been organized under these themes, by grade level benchmarks (K-12), and aligned with the national education standards. This type of design assists educators with the opportunity to contextualize content for multidisciplinary integration and provides for an interdisciplinary approach to teaching and learning. In addition, this type of integration provides a continuum for transdisciplinary knowledge application to solve real-world problems (Vasquez, Sneider & Comer, 2013). The National Agricultural Literacy Outcomes have been reviewed by stakeholders and members of the National Agriculture in the Classroom Curriculum Matrix Committee: Traci Curry - Chair (NM), Dana Bessinger (OK), Judy Culbertson (CA), Jessie Dafoe (WY), Lynda Danos (LA), Kevin Daugherty (IL), Willie Grenier (ME), Vonne Knight (SC), Monica Pastor (AZ), and Al Withers (MN). Each outcome was evaluated to determine its significance to agricultural literacy and its grade level appropriateness. It is hoped that K-12 teachers will embrace the NALOs and contextualize their curriculum with meaningful, authentic agricultural examples and activities that will result in high school graduates who understand and can communicate with others the source and value of agriculture as it affects the students' quality of life.

The benchmarks and corresponding outcomes have been aligned with three academic content areas: science, social studies, and health. As educators review the themes and associated outcomes, it is easy to see how the theme outcomes cross disciplines and provide an opportunity for content integration for enduring understandings.

The completion of the NALOs has been crucial to the development of the National Agricultural Literacy Curriculum Matrix (NALCM). The NALCM (or, hereafter, the "Matrix") is a searchable online database providing innovative and peer-reviewed lesson plans and relevant supportive companion resources addressing agricultural literacy. Resources in the Matrix (http://agclassroom.org) have been selected because they contextualize agricultural concepts that meet the identified NALOs; the national education content standards in the areas of science, health, and social studies; and the Common Core Anchor and Practices Standards. The Matrix allows users to search by keywords, grade, content area, type of resource, core standards, state specific/submitted content, or by outcome. Users may also create a login and save resources in a personal library for later access.

The National Agricultural Literacy Outcomes outline critical benchmarks for agricultural literacy. The National Agricultural Literacy Curriculum Matrix is the vehicle that can contextualize academic content and provide educators with high quality, relevant, meaningful, and engaging resources that lead to enduring understandings. The NALOs and the Matrix should not be viewed as static or complete, but rather as a dynamic, on-going, and evolving effort. It is anticipated that the NALOs and educational standards will change. What will not change is the need for agricultural literacy, especially as we move forward to address global issues for meeting human basic needs. Continued stakeholder and educator involvement will be required to effectively engage K-12 students with the NALOs and achieve increased levels of academic "enduring" understandings.

Debra M. Spielmaker, PhD
*Project Director*
National Agricultural Literacy Curriculum Matrix

# Theme 1

# Agriculture and the Environment

Agriculture has transformed and had to work with natural ecosystems to fulfill societal needs. Agro-ecosystems are now recognized as a major part of global ecosystems. To understand the processes and components, and the dependence and interactions of organisms and environment in natural systems, is to understand the dynamics of agricultural systems. Agriculture and natural resource management is a science-based human activity subject to divergence of opinions and public policies influencing the development and application of science and technology for the public good. Inputs and outputs of modern agriculture and food industries involve many technologies based on both public and private research and development. Theme 1 examines the relationship between agriculture and the environment.

| Grade Level Benchmarks | Agriculture and the Environment Outcomes<br>• Social Studies related content<br>• Science related content |
|---|---|
| **Early Elementary**<br>(Kindergarten - Grade 2)<br><br>T1.K-2 | a. Describe how farmers/ranchers use land to grow crops and support livestock<br>b. Describe the importance of soil and water in raising crops and livestock<br>c. Identify natural resources<br>d. Provide examples of how weather patterns affect plant and animal growth for food |
| **Upper Elementary**<br>(Grades 3-5)<br><br>T1.3-5 | a. Describe similarities and differences between managed and natural systems (e.g., wild forest and tree plantation; natural lake/ocean and fish farm)<br>b. Explain how the interaction of the sun, soil, water, and weather in plant and animal growth impacts agricultural production<br>c. Identify land and water conservation methods used in farming systems (wind barriers, conservation tillage, laser leveling, GPS planting, etc.)<br>d. Identify the major ecosystems and agro-ecosystems in their community or region (e.g., hardwood forests, conifers, grasslands, deserts) with agro-ecosystems (e.g., grazing areas and crop growing regions)<br>e. Recognize the natural resources used in agricultural practices to produce food, feed, clothing, landscaping plants, and fuel (e.g., soil, water, air, plants, animals, and minerals) |
| **Middle School**<br>(Grades 6-8)<br><br>T1.6-8 | a. Compare and contrast the advantages and disadvantages involved when converting natural ecosystems to agricultural ecosystems<br>b. Describe benefits and challenges of using conservation practices for natural resources (e.g., soil, water, and forests), in agricultural systems which impact water, air, and soil quality<br>c. Discover how natural resources are used and conserved in agriculture (e.g., soil conservation, water conservation)<br>d. Discuss (from multiple perspectives) land and water use by various groups (i.e., ranchers, farmers, hunters, miners, recreational users, government, etc.), and how each use carries a specific set of benefits and consequences that affect people and the environment<br>e. Discuss the comparative environmental pros and cons of populations relying on their local and regional resources versus tapping into a global marketplace<br>f. Explain and discuss why people migrate and change environments to meet their basic needs<br>g. Recognize how climate and natural resources determine the types of crops and livestock that can be grown and raised for consumption<br>h. Recognize the factors of an agricultural system which determine its sustainability |
| **High School**<br>(Grades 9-12)<br><br>T1.9-12 | a. Describe how wildlife habitats are created and maintained by farmers/ranchers and why these habitats are important (e.g., promoting pollinator habitat, insect refuges, creating buffer zones for nutrient management, etc.)<br>b. Describe resource and conservation management practices used in agricultural systems (e.g., riparian management, rotational grazing, no till farming, crop and variety selection, wildlife management, timber harvesting techniques)<br>c. Discuss the scientific basis for regulating the movement of plants and animals worldwide to control for the spread of potentially harmful organisms (e.g., invasive species and disease causing organisms such as foot and mouth disease and avian and swine flu) as well as the methods of control in place (state, national, and international policies, economic incentives)<br>d. Discuss the value of agricultural land<br>e. Evaluate the potential impacts of climate change on agriculture<br>f. Evaluate the various definitions of “sustainable agriculture,” considering population growth, carbon footprint, environmental systems, land and water resources, and economics<br>g. Identify non-native or invasive species in your state that impact the sustainability and/or economic value of natural or agricultural ecosystems<br>h. Understand the natural cycles that govern the flow of nutrients as well as the way various nutrients (organic and inorganic) move through and affect farming and natural systems |

# Theme 2

# Plants and Animals for Food, Fiber & Energy

Early humans developed agriculture as an alternative to hunting and gathering. This transition not only began to free up labor but resulted in surpluses of various goods, which could, in turn, be traded. Since the domestication and cultivation of plants, and the domestication and raising of animals (agriculture), humans have been experimenting with genetics, types of soils, climate, production practices, and harvesting to meet the needs of a growing population.

Agriculture provides the food supply needed for survival, growth, and health for both humans and animals. The variety of year-round food choices has grown; foods not locally produced are available partly due to the transportation and distribution networks. The major factors in food and feed choices for people and their animals are cost, culture, convenience, and access and/or availability. Theme 2 focuses on the importance and stewardship of natural resources in sustainably delivering high quality food, fiber, and energy while at the same time maintaining a quality environment.

| Grade Level Benchmark | Plants and Animals for Food, Fiber & Energy Outcomes<br>Academic Content Areas<br>• Social Studies<br>• Science<br>• Health |
|---|---|
| **Early Elementary**<br>(Kindergarten - Grade 2)<br><br>T2.K-2 | a. Explain how farmers/ranchers work with the lifecycle of plants and animals (planting/breeding) to harvest a crop<br>b. Identify animals involved in agricultural production and their uses (i.e., work, meat, dairy, eggs)<br>c. Identify examples of feed/food products eaten by animals and people<br>d. Identify food safety practices to demonstrate at home<br>e. Identify the importance of natural resources (e.g., sun, soil, water, minerals) in farming<br>f. Identify the types of plants and animals found on farms and compare with plants and animals found in wild landscapes |
| **Upper Elementary**<br>(Grades 3-5)<br><br>T2.3-5 | a. Discuss similarities and differences in food, clothing, shelter, and fuel sources among world cultures<br>b. Distinguish between renewable and non-renewable resources used in the production of food, feed, fuel, fiber (fabric or clothing) and shelter<br>c. Explain how the availability of soil nutrients affects plant growth and development<br>d. Provide examples of specific ways farmers/ranchers meet the needs of animals<br>e. Understand the concept of stewardship and identify ways farmers/ranchers care for soil, water, plants, and animals |
| **Middle School**<br>(Grades 6-8)<br><br>T2.6-8 | a. Describe the differences in plants and animals used for food, clothing, shelter, and fuel before and after European settlement of the United States<br>b. Explain the role of ethics in the production and management of food, fiber (fabric or clothing), and energy sources<br>c. Identify farm practices for plant protection (e.g., using a pesticide, integrated pest management, cultural practices) and the harvest of safe products for consumers<br>d. Identify renewable and nonrenewable energy sources<br>e. Identify strategies for housing for animal welfare and the safety of animal products (e.g., meat, milk, eggs)<br>f. Identify where labeling indicates the origin of food and fiber (fabric or clothing) |
| **High School**<br>(Grades 9-12)<br><br>T2.9-12 | a. Compare and contrast the differences between nature's plant and animal lifecycles with agricultural systems (e.g., producers manage the lifecycle of plants and animals to produce a product for consumption)<br>b. Compare similarities and differences between organic and inorganic nutrients (i.e., fertilizer) on plant growth and development; determine how their application affects plant and animal life<br>c. Discuss reasons for government's involvement in agricultural production, processing, and distribution<br>d. Evaluate evidence for differing points of view on topics related to agricultural production, processing, and marketing (e.g., grazing; genetic variation and crop production; use of fertilizers and pesticides; open space; farmland preservation; animal welfare practices; world hunger)<br>e. Identify inspection processes associated with food safety regulations |

# Theme 3

# Food, Health & Lifestyle

Healthful eating means eating a variety of nutritious foods. Food contains six nutrients that people need for good health. These nutrients include carbohydrates, proteins, fats, minerals, vitamins, and water. The United States Department of Agriculture (USDA) makes general recommendations about what people should eat. The USDA's "My Plate" features a dinner plate divided into four sections: fruits, grains, vegetables, and protein, with dairy pictured as a glass alongside the plate. Vegetables and grains have the largest recommended daily serving size, and proteins and fruits are slightly smaller in serving size, along with dairy.

Farmers and ranchers provide a variety of year-round food choices. Foods not locally produced are available partly due to the transportation and distribution networks. The major factors in food choices have been cost, culture, convenience, and access and/or availability. Advertisements are another form of information that guide food choices. Recently, Americans have become more interested in how food is produced, its nutritional value, agriculture's impact on the environment, and the contribution agriculture makes to the local economy and landscape. Consumer demand ultimately influences what is produced and how it is processed and marketed.

The U.S. food supply is considered the safest in the world. Still, food safety issues exist in the U.S. and abroad. According to food safety experts, improper storage, handling, and preparation of food—both at home and at food establishments—pose the top food safety problems today. Everyone who handles food in any form should know the basic safe food-handling practices. Safety concerns include microbiological contamination and non-living contaminates such as drug and pesticide residues and bone fragments. Contamination can occur during any step of food processing, storage, or handling of food products. The USDA regulates food processors and also provides consumer guidelines for safe handling, preparation, and storage of foods. Theme 3 explores the relationship between food production, storage, preparation, consumption, and health.

| Grade Level Benchmark | Food, Health, and Lifestyle Outcomes<br>Academic Content Areas<br>• Social Studies<br>• Health |
|---|---|
| **Early Elementary**<br>(Kindergarten - Grade 2)<br><br>T3.K-2 | a. Identify healthy food options<br>b. Recognize that agriculture provides our most basic necessities: food, fiber (fabric or clothing), energy, and shelter<br>c. Understand where different types of foods should be stored safely at home |
| **Upper Elementary**<br>(Grades 3-5)<br><br>T3.3-5 | a. Describe the necessary food components of a healthy diet using the current dietary guidelines<br>b. Diagram the path of production for a processed product, from farm to table<br>c. Distinguish between processed and unprocessed food<br>d. Explain the costs associated with producing and purchasing food<br>e. Explain the practices of safe food handling, preparation, and storage<br>f. Identify careers in food, nutrition, and health<br>g. Identify food sources of required food nutrients |
| **Middle School**<br>(Grades 6-8)<br><br>T3.6-8 | a. Demonstrate safe methods for food handling, preparation, and storage in the home<br>b. Evaluate food labels to determine food sources that meet nutritional needs<br>c. Evaluate serving size related to nutritional needs<br>d. Explain how factors, such as culture, convenience, access, and marketing affect food choices locally, regionally, and globally<br>e. Explain the benefits and disadvantages of food processing<br>f. Explain the role of ethics in the production and management of food, fiber (fabric or clothing), and energy sources<br>g. Identify agricultural products (foods) that provide valuable nutrients for a balanced diet<br>h. Identify forms and sources of food contamination relative to personal health and safety<br>i. Identify sources of agricultural products that provide food, fuel, clothing, shelter, medical, and other non-food products for their community, state, and/or nation<br>j. Identify the careers in food production, processing, and nutrition that are essential for a healthy food supply |
| **High School**<br>(Grades 9-12)<br><br>T3.9-12 | a. Accurately read labels on processed food to determine nutrition content<br>b. Compare the changes in nutritional needs of humans over their lifetimes<br>c. Describe the nutritional value that can be added by processing foods<br>d. Evaluate the cost of food in the United States relative to other countries<br>e. Explain food labeling terminology related to marketing and how it affects consumer choices (e.g., natural, free-range, certified organic, conventional, cage-free, zero trans-fat, sugar-free, reduced calorie)<br>f. Explain how food production systems are influenced by consumer choices<br>g. Identify how various foods can contribute to a healthy diet<br>h. Provide examples of foodborne contaminants, points of contamination, and the policies/agencies responsible for protecting the consumer |

# Theme 4

# Science, Technology, Engineering & Mathematics

According to most historians, the development of agriculture resulted in the beginning of civilization. Agricultural development has relied on evolving scientific understandings, engineering processes, and the application of both to develop innovative technologies to save labor and increase yields. In the early 1900s, 50% of the U.S. population lived in rural areas, and 30% made their living on the farm (U.S. Department of Agriculture, 2014). Technological advancements of the last century have resulted in a nation where just over 1% (Central Intelligence Agency, 2013) of the population make their living on farms and ranches. It may seem that we no longer need to consider agricultural careers as important or relevant; however, it takes 21 million workers, or about 15% of the U.S. population, to support farm and ranch production, processing, and marketing (Goecker, Smith, Smith, & Goetz, 2010). The fact that 1% of the population produces for the other 99% is a real achievement! What has happened to cause this change in 100 years? Science, technology, engineering and mathematical understandings to address labor, and solve production and environmental problems.

The science and technologies applied to agriculture and food rival the science and technologies applied to medicine. Agriculture is the “other” major health science—applying science, engineering, technology, and mathematics to improve the health of plants and animals, of people, and our environment. The fields of mechanical engineering, microbiology, genetics, and chemistry have their origins intrinsically linked with agriculture and food, and while we have fewer people working on farms, the 21 million workers that support agricultural production include scientists, engineers, and entrepreneurs.

Our quality of life is dependent upon the continued development and appropriate use of science and engineering to provide an abundance of safe, healthy, nutritious food, fibers, and the fuels necessary to sustain the needs of a growing world population. At the same time, we need to sustain the natural resource base of this planet—on which all life depends! While yields and labor-saving technologies remain important, future agricultural scientists and engineers will need to solve additional problems that will lead to a more sustainable agricultural system that feeds a growing population. Theme 4, understanding the science, engineering, technology, and mathematics of agriculture, food, and natural resources is crucial for the future of all humanity.

| Grade Level Benchmark | Science, Technology, Engineering & Mathematics Outcomes<br>Academic Content Areas<br>• Social Studies<br>• Science |
|---|---|
| **Early Elementary**<br>(Kindergarten - Grade 2)<br><br>T4.K-2 | a. Explain what tools and materials farmers/ranchers use to reduce heating and cooling in plant and livestock structures<br>b. Recognize and identify examples of simple tools and machines used in agricultural settings (e.g., levers, screws, pulley, wedge, auger, grinder, gears, etc.) |
| **Upper Elementary**<br>(Grades 3-5)<br><br>T4.3-5 | a. Compare simple tools to complex modern machines used in agricultural systems to improve efficiency and reduce labor<br>b. Describe how technology helps farmers/ranchers increase their outputs (crop and livestock yields) with fewer inputs (less water, fertilizer, and land) while using the same amount of space<br>c. Identify examples of how the knowledge of inherited traits is applied to farmed plants and animals in order to meet specific objectives (i.e., increased yields, better nutrition, etc.)<br>d. Provide examples of science being applied in farming for food, clothing, and shelter products |
| **Middle School**<br>(Grades 6-8)<br><br>T4.6-8 | a. Compare and contrast historical and current food processing and systems<br>b. Describe how biological processes influence and are leveraged in agricultural production and processing (e.g., photosynthesis, fermentation, cell division, heredity/genetics, nitrogen fixation)<br>c. Describe the process of development from hunting and gathering to farming<br>d. Discuss how technology has changed over time to help farmers/ranchers provide more food to more people<br>e. Explain how and why agricultural innovation influenced modern economic systems<br>f. Explain the harmful and beneficial impacts of various organisms related to agricultural production and processing (e.g., harmful bacteria/beneficial bacteria, harmful/beneficial insects) and the technology developed to influence these organisms<br>g. Identify science careers related to both producers and consumers of agricultural products<br><br>h. Identify specific technologies that have reduced labor in agriculture<br>i. Provide examples of science and technology used in agricultural systems (e.g., GPS, artificial insemination, biotechnology, soil testing, ethanol production, etc.); explain how they meet our basic needs; and detail their social, economic, and environmental impacts |
| **High School**<br>(Grades 9-12)<br><br>T4.9-12 | a. Correlate historical events, discoveries in science, and technological innovations in agriculture with day-to-day life in various time periods<br>b. Describe how agricultural practices have contributed to changes in societies and environments over time<br>c. Discuss population growth and the benefits and concerns related to science and technologies applied in agriculture to increase yields and maintain sustainability<br>d. Evaluate the benefits and concerns related to the application of technology to agricultural systems (e.g., biotechnology)<br>e. Identify current and emerging scientific discoveries and technologies and their possible use in agriculture (e.g., biotechnology, bio-chemical, mechanical, etc.)<br>f. Predict the types of careers and skills agricultural scientists will need in the future to support agricultural production and meet the needs of a growing population<br>g. Provide examples of how processing adds value to agricultural goods and fosters economic growth both locally and globally |

# Theme 5

# Culture, Society, Economy & Geography

Agriculture and natural resource systems have played a key role in the development of the United States and the sustainability of civilizations throughout the history of the world. Agriculture changed from hunting and gathering to forms of permanent agriculture, which in turn led the way for expansion of agricultural production and the integration of new technologies. Producing, processing, marketing, and distributing food, fuel, clothing, and shelter have been the work of most of humanity through the ages to ensure survival.

Largely, geographic location (longitude, latitude, elevation, soil type and precipitation) determines what plants and animals will grow and, therefore, determines what humans and animals will generally eat, what materials will be available for building shelters, making clothing, and providing fuel. As a result, distinct diets emerge for people living in different places in the world. Religion and other customs have further guided people's food choices, language, dress, festivals, and artistic expressions, which we often refer to as culture.

As productivity of agriculture increased through the application of science and technology, global trade of agricultural products expanded, which led to the development of more industrialized societies. Also, changes in the demand for agricultural workers from production (farming) to science, processing, and related agri-businesses resulted. Today, food, fiber, and fuel are traded globally, and often products travel thousands of miles from where they were produced to where they are consumed.

The global movement of agricultural products continues to be driven by economics, and consumer demand and preferences. Agriculture, food, and natural resource systems continue to play an integral role in the evolution of societies both in the United States and the world.

| Grade Level Benchmark | Culture, Society, Economy & Geography Outcomes<br>Academic Content Areas<br>• Social Studies |
|---|---|
| **Early Elementary**<br>(Kindergarten - Grade 2)<br><br>T5.K-2 | a. Discuss what a farmer does.<br>b. Explain why farming is important to communities<br>c. Identify places and methods of exchange for agricultural products in the local area<br>d. Identify plants and animals grown or raised locally that are used for food, clothing, shelter, and landscapes<br>e. Identify the people and careers involved from production to consumption of agricultural products<br>f. Trace the sources of agricultural products (plant or animal) used daily |
| **Upper Elementary**<br>(Grades 3-5)<br><br>T5.3-5 | a. Describe how supply and demand impact the price of agricultural goods<br>b. Discover that there are many jobs in agriculture<br>c. Explain how agricultural events and inventions affect how Americans live today (e.g., Eli Whitney - cotton gin; Cyrus McCormick - reaper; Virtanen - silo; Pasteur - pasteurization; John Deere - moldboard plow)<br>d. Explain the value of agriculture and how it is important in daily life<br>e. Provide examples of agricultural products available, but not produced in their local area and state<br>f. Understand the agricultural history of an individual's specific community and/or state |
| **Middle School**<br>(Grades 6-8)<br><br>T5.6-8 | a. Consider the economic value of agriculture in America<br>b. Distinguish between careers in production (farmers and ranchers) with those that directly involve consumers (business and nutrition)<br>c. Explain how agricultural production and trade led to the development of industrialized societies<br>d. Explain how prices for agricultural goods are determined<br>e. Explain the role of exploration and trade in sustaining early societies<br>f. Highlight the interaction and significance of state historical and current agricultural events on governmental and economic developments (e.g., the building of railroads, the taxation of goods, etc.)<br>g. Identify agricultural products that are exported and imported<br>h. Identify farm ownership in relation to processor ownership (e.g., cooperatives, corporations, vertical integration) |
| **High School**<br>(Grades 9-12)<br><br>T5.9-12 | a. Communicate how the global agricultural economy and population influences the sustainability of communities and societies<br>b. Compare and contrast the advantages and disadvantages of fewer farmers/ranchers<br>c. Compare and contrast the economic challenges facing developed and under-developed countries (poverty, population, and hunger)<br>d. Describe essential agricultural careers related to production, consumption, and regulation<br>e. Discuss how agricultural practices have increased agricultural productivity and have impacted (pro and con) the development of the global economy, population, and sustainability<br>f. Discuss the relationship between geography (climate and land), politics, and global economies in the distribution of food<br>g. Evaluate and discuss the impact of major agricultural events and agricultural inventions that influenced world and U.S. history<br>h. Explain how comparative and absolute advantage in agriculture impacts supply and demand in relation to trade<br>i. Explain the role of government in the production, distribution, and consumption of food<br>j. Provide examples of how changes in cultural preferences influence production, processing, marketing, and trade of agricultural products |

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# *Notes*

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