The Impact of Selected Agriculture in the Classroom Teachers on Student Agricultural Literacy

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Abstract:
The national Agriculture in the Classroom (AITC) program is the largest public effort to educate people about agriculture. If the program is to reach its full potential, AITC must be consistent with research based teaching practices that will insure all students become agriculturally literate. Baseline data needs to be developed to ascertain what students are learning about agriculture from AITC trained teachers. These findings can provide key indicators of progress being made toward the achievement of program goals. By identifying where gaps in student agricultural knowledge occur, program leaders will be better able to focus efforts in instructional material development and teacher training.

The purpose of this study is to assess the agricultural knowledge of selected public school classrooms in grades kindergarten through sixth that have received instruction from teachers trained by Agriculture in the Classroom. A profile of student agricultural knowledge will be developed by grade groupings that can be used to direct future curriculum development and teacher training efforts. In addition, teacher profiles will be developed that describe their education and background, type of agricultural literacy preparation, how agricultural knowledge is integrated into instruction, and how these teacher agricultural connections relate to student agricultural knowledge.

This study will use a variation of the quasiexperimental pre- posttest nonequivalent-control group design. The treatment group will be comprised of classrooms (grades kindergarten through sixth) with AITC trained teachers. The control group will be comprised of classrooms (grade kindergarten through sixth) with teachers that have had no exposure to AITC and selected from schools that are demographically similar.

It is anticipated that at least six states will be involved in this study. In each state, two classrooms at each of the seven grade levels will be included in the treatment group, and the control group. It is estimated that approximately 20 students will be enrolled per classroom. A total of 84 treated classrooms and 84 control classrooms will be included in the study. Student knowledge about agriculture will be assessed for both the treatment and control groups using the Food and Fiber Systems Literacy Tests.

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Rationale for Study

America's food and fiber systems determine the nations' general welfare and standard of living. Today, nearly ninety percent of the population is two or three generations removed from direct contact with food and fiber production (Leising and Zilbert, 1994). As a result, youth know little about agricultural production, processing, marketing, distribution, regulation or research.

In 1988, the National Research Council's Committee on Agricultural Education in Secondary Schools proposed that an agriculturally literate person would understand the food and fiber system in relation to its history, economic, social, and environmental significance (National Research Council, [NRC] 1988). The committee also recommended that "all students should receive at least some systematic instruction about agriculture beginning in kindergarten or first grade and continuing through twelfth grade" (NRC, 1988, p.10).

Frick, in 1990, reported one of the first conclusive agricultural literacy definitions: "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, analyze, and communicate basic information about agriculture" (p.52).

Nunnery (1996) noted the necessity for building a literacy framework for understanding agriculture's perspectives and viewpoints. Leising and Zilbert (1994) approached agricultural literacy from this same perspective. They developed a systematic curriculum framework identifying what students should know or be able to do. The Food and Fiber Systems Literacy Framework (FFSL) explained what an agriculturally literate high school graduate should comprehend. Using a series of standards in five thematic areas, the framework delineated the necessary components for understanding the way food and fiber systems relate to daily life. Breaking the standards into grade-grouped benchmarks, K-1, 2-3, 4-5, 6-8, 9-12, the framework provided a systematic means of addressing agricultural literacy.

Much of the agricultural literacy research has focused on teacher perceptions and knowledge of agriculture, assessment of instructional materials, and the defining of agricultural literacy (Cox, 1994; Elliot & Frick, 1995; Frick, 1990; Harris & Birkenholtz, 1993; Pals, 1998a,b; Terry, 1990; Trexlar, 1997; Wallace, 1995; Wilhelm, 1998). In

evaluating the Georgia Agriculture in the Classroom program, however, Herren and Oakley (1995) developed instruments to assess student agricultural knowledge at the second and fourth grade levels and concluded that Agriculture in the Classroom programs were effective in teaching agricultural concepts in both rural and urban settings. Swortzel (1996) reported an Ohio study assessing fourth-graders' knowledge of animal agriculture. A pretest/posttest design was used and a statistically significant difference was shown between the two test scores with greater gains for students living in urban areas.

Igo (1998) studied three schools (K-8) that used the Food and Fiber Systems Literacy Framework for infusing agriculture into the core curriculum. He found that it was possible to use the standards and grade-grouped benchmarks to infuse instruction about agriculture and increase student knowledge of agriculture. Also, Igo reported strong relationships between student agricultural knowledge gains and the number of instructional connections teachers made to the Food and Fiber Systems Literacy Framework.

Prior to the study and resultant recommendations made by the NRC (1988) that students at all grade levels (K-12) receive training that would contribute to the development of their agricultural literacy, programs did exist for the purpose of educating children in the elementary grades about agriculture. Agriculture in the Classroom (AITC) was one program designed to accomplish this, and was formalized by the United States Department of Agriculture in 1981. These programs were set up in every state and traditionally organized through state departments of agriculture and/or education and farm organizations such as Farm Bureau (Traxler, 1990).

While states have not been bound by USDA goals for AITC, many states have developed their own, much like those in Illinois. Illinois' state AITC goals are to: "(a) provide for a systematic infusion of agricultural concepts into the basic subject areas of the curriculum, and (b) to provide in-service training to teachers of the basic subject areas in order to provide necessary background information for incorporation of agricultural knowledge into their respective subject areas" (Law, 1990, p. 6). Illinois has sought to accomplish these goals by providing instructional materials and curriculum guides that incorporate agricultural knowledge into basic subject areas, and conduct in-service workshops for elementary/middle school teachers on how to use the materials.

Many state AITC programs have developed instructional materials for infusing agriculture into the classroom and have held teacher training workshops, but few have conducted on-going assessments to determine what agricultural knowledge students are learning. Therefore, baseline data needs to be developed to ascertain what students are learning about agriculture from AITC trained teachers. These findings can provide key indicators of progress being made toward the achievement of program goals. By identifying where gaps in student knowledge of agriculture occur, program leaders will be better able to focus efforts in instructional material development and teacher training.

The NRC Report (1988) recommended that all students receive agricultural literacy training. AITC programs are the largest organized effort to date. If they are to reach

their full potential, they must be consistent with research based teaching practices that will insure all students become agriculturally literate.

Purposes and Objectives

The purpose of this study is to assess the agricultural knowledge of selected public school classrooms in grades kindergarten through sixth that have received instruction from teachers trained by Agriculture in the Classroom. A profile of student agricultural knowledge will be developed by grade groupings that can be used to direct future curriculum development and teacher training efforts. In addition, teacher profiles will be developed that describe their education and background, type of agricultural literacy preparation, how agricultural literacy is integrated into instruction and the relationship between teacher agricultural connections and student agricultural knowledge. The specific objectives include:

1. Compare differences by grade grouping (K-1, 2-3, 4-5, 6) between the AITC treatment group and control group in student knowledge about agriculture, before and after instruction, based on the Food and Fiber Systems Literacy Curriculum Framework.

2. Compare differences by grade grouping between the AITC treatment group and control group in student knowledge about agriculture, before and after instruction, using the five thematic areas of the FFSL Framework.

3. Develop a profile of student knowledge about agriculture, before and after instruction, for each grade grouping.

4. Develop a profile of AITC teachers that includes education, agricultural experience, place of residence, amount of AITC inservice education, number of other inservice courses typically taken in a given year, instructional practices and materials used.

5. Determine if a relationship existed between student knowledge about agriculture (based on the FFSL) and variables, such as amount of time teachers spend infusing agriculture in the classroom, place of residence, amount and kind of inservice education and perceptions of agriculture.

Methods and Procedures

This study will use a variation of the quasi-experimental pre- posttest nonequivalent-control group design described by Campbell and Stanley (1963). The treatment group will be comprised of classrooms (grades kindergarten through sixth) with AITC trained teachers. AITC teachers/classrooms will be randomly selected from states in at least two USDA regions that have demonstrated strong AITC programs. A project external

advisory committee of state AITC coordinators and USDA AITC staff will recommend states for participation in the study.

The control group will be comprised of classrooms (grade kindergarten through sixth) with teachers that have had no exposure to AITC. The control group will be selected from schools that are similar in geographic location, family income levels, and size of schools in the treatment group.

It is anticipated that at least six states will be involved in this study. In each state, two classrooms at each of the seven grade levels will be included in the treatment group, and the control group. It is estimated that approximately 20 students will be enrolled per classroom. A total of 84 treated classrooms and 84 control classrooms will be included in the study.

Instrumentation

Student Knowledge
Student knowledge of agriculture will be assessed for both the treatment and control groups using the Food and Fiber Systems Literacy Tests. The four instruments developed by Leising and Igo (1999) for assessing food and fiber systems knowledge of students will be used in pre- and post-assessment. These include K-1, 2-3, 4-5 and 6-8. Questions on each instrument were based on the grade-grouped benchmarks. The K-1 and 2-3 instruments included 16 and 21 items respectively. Both primarily used a format consisting of questions to be read by the teacher followed by a series of illustrations from which the students were to select the correct answer or answers. The K-1 instrument responses were entirely pictures, while the 2-3 instrument used pictures and simple text responses. The 4-5 and 6-8 grade level instruments contain 35 and 30 text-responses respectively. The instruments were pilot-tested with groups of students not included in the study. Researchers had used these instruments in earlier studies. The internal consistency was established using Guttman's Split-Halves reliability coefficients. The reliability coefficient for the K-1 instrument was 0.7763 and the reliability coefficient for the grade 2-3 instrument was 0.9469. The grade 4-5 instrument yielded a coefficient of 0.7892, and the 6-8 instrument yielded a reliability coefficient of 0.7879.

Teacher Knowledge
A teacher survey instrument will be developed consisting of two parts. For Part 1, a test instrument will be developed to assess the agricultural knowledge of teachers based on the FFSL Framework. For Part 2, a demographic instrument will be developed to collect data about the teacher's experience in agriculture, academic preparation, age, experience in teaching, number of in-service courses typically taken in a given year, perceptions of agriculture, place of residency, how agriculture is being infused into core academic subjects, amount of classroom time used to infuse agriculture and teaching practices/lessons that work. Also, teachers will be asked what kinds of instructional materials are needed and how the Agriculture in the Classroom program can be of greater assistance.

Treatment and Control Groups

The treatment group will consist of a total of 84 classrooms in six states. Each state's treatment group will comprise two teachers/classrooms trained by Agriculture in the Classroom for each of the seven grade levels (K-6) to be studied. The 84 teachers/classrooms will be purposely selected by state AITC coordinators.

The control group will consist of a total of 84 teachers/classrooms in the same six states from which the treated group is taken. Criteria for selecting the two teachers/classrooms for each of the seven grade levels in the control group include similar geographic location, family income levels, size of schools in the treatment group, and no training or use of AITC materials in the school or classroom.

Data Collection

Student data will be collected from 84 treated teachers/classrooms and 84 control teachers/classrooms twice during the 2001/02 academic year. The pretest of student agricultural knowledge will be administered in the months of September/October, 2001, and a posttest will be administered in the months of March/April, 2002. Teacher data will be collected only once from both treatment and control groups in September/October, 2001. It is anticipated that project staff will collaborate with AITC coordinators in the six states to select the teachers/classrooms for inclusion in the study. Project staff will prepare directions/procedures for collecting the data from each site and work with the AITC coordinator to visit the school and administer the instruments to teachers and students. Completed instruments will be collected by the AITC Coordinator and returned to the researchers by mail.

Analysis of Data
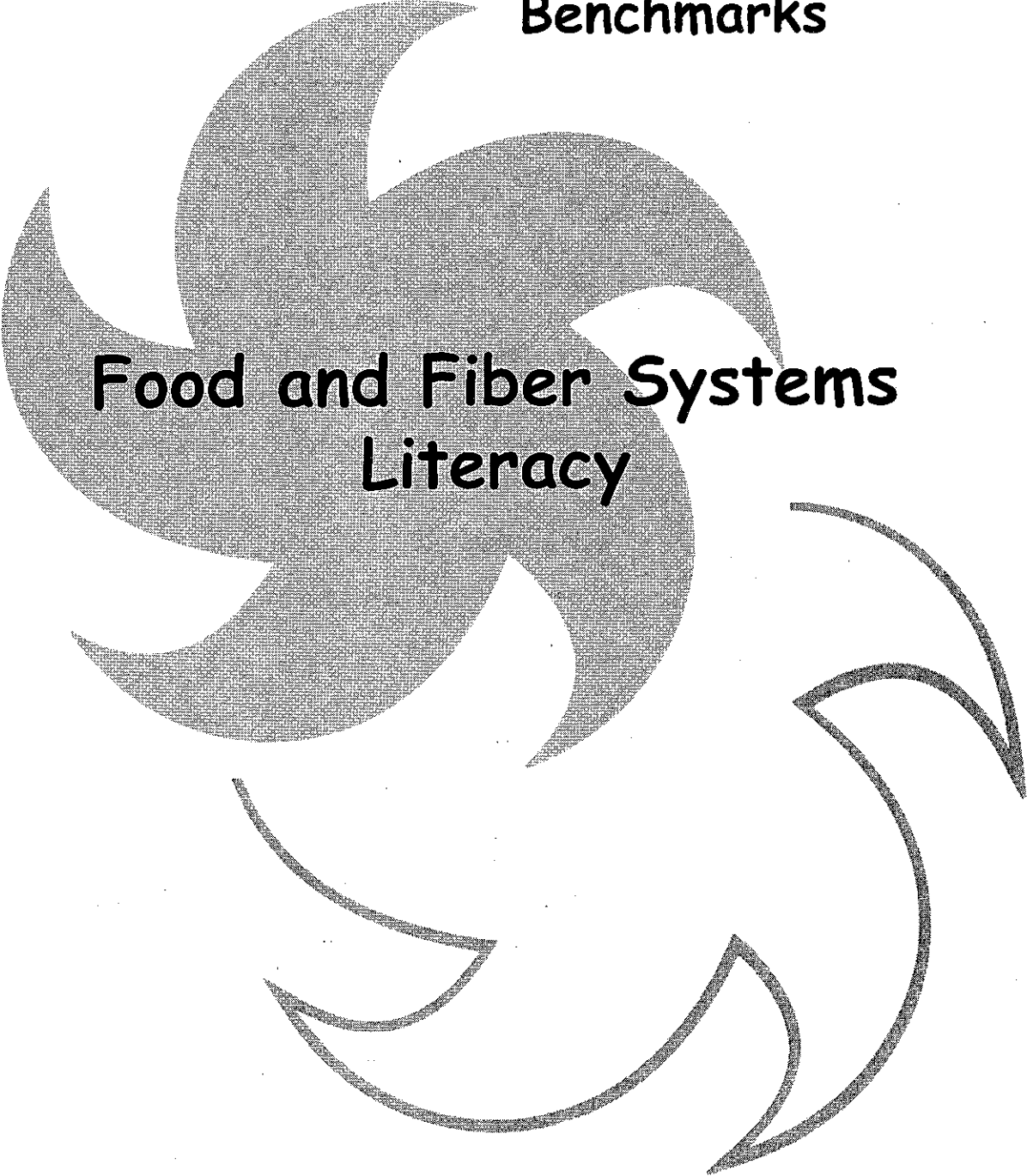
Student tests will be scored and coded into a Microsoft Excel spreadsheet for analysis. Teacher surveys will be coded and also entered into a Microsoft Excel spreadsheet. Means and percentages will be computed by grade-level grouping for the pretest scores from both the treatment and control groups. Test site data collectors will be instructed to posttest only those students that were pre-tested, and the posttest data will be handled in the same manner following the administration and retrieval of those instruments. The same descriptive statistics will be computed on the posttest scores, again by grade-level grouping.

T-tests will be performed using SAS 6.11 to determine differences in posttest knowledge mean scores between control and treatment groups by grade grouping. A Pearson's Product Moment Correlation will be computed to assess the relationship between pre- and posttest differences and the amount of time spent by the teacher infusing agriculture, as well as other variables. Teacher data will be summarized using means, frequencies and percentages.

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Timeline of Major Activities

Activity	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.

Submit IRB

Ident. & select Teacher/classrooms

Obtain admin. Consent forms

On-going advisory committee input

Develop teacher instrument

Pilot test teacher instrument

Develop testing procedures and data collection

Collect data
- Teacher
- Pre-test student
- Posttest student

Analyze data
- Teacher
- Student pre-test
- Student posttest

Preparation of reports
- Preliminary
- Final
  a. State
  b. Regional
- AITC National Conference

Standards and Benchmarks

Food and Fiber Systems Literacy

Project Overview

America's agriculture determines the nations' general welfare and standard of living. Today, nearly 90 percent of the population is two or three generations removed from direct contact with food and fiber production. As a result, youth know little about agricultural production, processing, marketing, distribution, regulation, or research.

The National Research Council established the Committee on Agricultural Education in Secondary Schools in 1985. This committee recommended that "beginning in kindergarten and continuing through twelfth grade, all students should receive some systematic instruction about agriculture." Since this report, many instructional materials have been developed to help youth learn about agriculture. However, educators and agriculturalists have been slow to develop a systematic K-12 curriculum framework for Food and Fiber Systems literacy.

In early 1996, Oklahoma State University, in cooperation with the W.K. Kellogg Foundation, began an initiative to create a shared vision of Food and Fiber Systems literacy. The primary goals of this project were to motivate students in K-12 schools to achieve higher levels of core academic competencies while becoming agriculturally literate citizens and resource managers. Food and Fiber Systems standards and benchmarks were identified and infused into the curriculum using classroom activities that encourage active learning. Through a sequential approach across the curriculum, it is expected Food and Fiber Systems education will allow 21st Century consumers to make more informed decisions from the supermarket to the voting booth.

Objectives

- Develop K-12 educational standards for Food and Fiber Systems that align with national education standards.
- Compile a K-8 instructional materials package to support standards.
- Establish a model for Food and Fiber Systems teacher training.
- Field test and evaluate the Food and Fiber Systems educational standards and benchmarks.
- Develop a Food and Fiber Systems web site and electronic clearinghouse for K-12 educators.

Strategy

Teachers, curriculum specialists, school administrators, and agricultural industry professionals were involved in developing the standards and benchmarks. Initial work was completed at the University of California, Davis. Further development and testing was completed during the 1997-1998 academic year at elementary and middle schools in California, Montana, Oklahoma, and Pennsylvania, under the leadership of Oklahoma State University.

A web site was created and is maintained by OSU's Department of Agricultural Education, Communications, and 4-H Youth Development. The web site includes general information about the project, a free, downloadable version of *A Guide to Food & Fiber Systems Literacy*, as well as lesson plans and instructional activities with links to other agricultural literacy sites. The web site URL is: **http://food_fiber.okstate.edu**

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Common Terms

Agricultural Literacy—possessing knowledge and understanding of Food and Fiber Systems. An individual possessing such knowledge can synthesize, analyze, and communicate basic information about agriculture.

Benchmark—statement identifying expected or anticipated skill or understanding relating to Food and Fiber Systems at various developmental levels. May be declarative, procedural, or contextual in the type of understanding it describes.

Food and Fiber Systems—term used synonymously with the term agriculture.

Food and Fiber Systems Literacy—term used synonymously with the term agricultural literacy.

Food and Fiber Systems Literacy Framework—a curriculum model with five thematic areas delineating what a person should know to be agriculturally literate. Included are descriptions of each theme's standards, and accompanying grade-grouped benchmarks.

Infusion—connecting core academic knowledge to Food and Fiber Systems Literacy Standards.

Instructional Connection—infusion of Food and Fiber Systems standards into classroom learning activities.

Standard—describes what a student should understand relative to Food and Fiber Systems.

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I. Understanding Food and Fiber Systems

Bench-marks	**Standards**		
	A. Understand the meaning of Food and Fiber Systems/agriculture.	**B. Understand the essential components of Food and Fiber Systems (e.g production, processing, marketing, distribution, research and development, natural resource management, and regulation).**	**C. Understand Food and Fiber Systems' relationship to society.**
K-1	Students will discover food, clothing, and shelter originate from plants and animals. They will match and/or illustrate a product and its origin.	Students will identify types of farms. They will match different kinds of farms to their products.	Students will identify Food and Fiber Systems products. They will give examples of agricultural products they use.
2-3	Students will tell how agriculture provides for people's basic food, clothing, and shelter needs. They will identify regional agricultural products and the basic needs they fulfill.	Students will describe the journey of an agricultural product from the farm to the consumer. They will label the sequence of steps a food or fiber product takes from production, processing, marketing and distribution to the consumer.	Students will identify people who work in Food and Fiber Systems. They will categorize people in the community who provide food, clothing, and shelter.
4-5	Students will identify the natural resources Food and Fiber Systems use to provide people's basic needs. They will describe how resources (rivers, forests, oceans, range land, etc.) contribute to world agricultural production.	Students will determine the role of natural resource management in Food and Fiber Systems. They will explain the importance of managing soil, air, water and energy to agricultural production.	Students will identify major agricultural commodities produced in their state. They will compare commodity output at state and national levels.
6-8	Students will define agriculture in terms of the components of the food and fiber system. They will show that agriculture is a complex system of production, processing, marketing and distribution.	Students will describe the function of food and fiber systems components, including production, processing, marketing, distribution, research and development, natural resource management, and regulation. They will discuss the function of each component.	Students will recognize Americans spend the smallest proportion of personal income on food. They will compare how much Americans spend on food to the amount others spend.
9-12	Students will explain why agriculture is the foundation of a nation's standard of living. They will demonstrate that Food and Fiber Systems must be sustainable, and resources used must be renewed and replenished.	Students will explain the importance of the essential components of Food and Fiber Systems and describe their interdependence. They will discuss how the components have changed.	Students will identify plant and animal products that serve as ingredients for producing products that meet societal needs other than food, clothing and shelter. They will explain plant and animal products and byproducts are used to manufacture medical, cosmetic, cleaning and other products.

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Standards		Bench-marks
D. Understand the local, national, and international importance of Food and Fiber Systems	**E. Understand Food and Fiber Systems careers.**	
Students will identify local food and fiber systems businesses. They will match these businesses to agricultural products.	Students will identify Food and Fiber Systems jobs in the community. They will collect pictures of people doing agricultural work.	**K-1**
Students will determine resources, such as water and land, are shared by households, businesses, and agriculture. They will describe examples of multiple uses for land and water resources.	Students will generate a list of Food and Fiber Systems careers. They will research characteristics of agricultural careers.	**2-3**
Students will explain how traders, explorers, and colonists brought plants and animals to this country. They will locate the origins of regional agricultural products available.	Students will examine the changes in food and fiber systems due to technological advances, and subsequent changes in occupational opportunities. They will identify agricultural careers and how they have changed.	**4-5**
Students will examine why agriculture is our oldest, largest, and most-essential industry. They will discuss the national and international importance of Food and Fiber Systems.	Students will recognize that agricultural inventions and discoveries produce new career opportunities. They will compare knowledge, skills, and attitudes required for entry-level, technical, and professional careers in Food and Fiber Systems.	**6-8**
Students will explain how globalization has impacted commodities traded on world markets. They will cite examples of how global markets affect personal and professional choices.	Students will discuss non-traditional agricultural careers and their effects on other industries. They will create a career path and determine its relationship to Food and Fiber Systems.	**9-12**

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II. History, Geography, and Culture

Bench-marks	Standards		
	A. Understand Food and Fiber Systems' role in the evolution of civilizations.	B. Understand Food and Fiber Systems' role in societies throughout world history.	C. Understand Food and Fiber Systems' role in U.S. history.
K-1	Students will illustrate how agriculture provides food, clothing and shelter. They will classify agricultural products as food, clothing, or shelter.	Students will illustrate how events, such as seasonal festivals, focus on food and fiber systems. They will identify agriculture-based celebrations or festivals in the community.	Students will realize most early Americans were agriculturalists. They will identify prominent early Americans involved in food and fiber systems.
2-3	Students will explain how agriculture is the foundation of civilizations. They will identify family experiences or involvement with food and fiber systems.	Students will identify an early society. They will illustrate agriculture's role in sustaining that society.	Students will describe how native and settler populations interacted with the environment. They will identify the origins of food, clothing, and shelter of American Indians and early settlers.
4-5	Students will analyze how early inhabitants mostly relied on hunting and gathering. They will describe agricultural changes from nomadic societies to permanent settlements.	Students will discuss how the desire to obtain exotic foods and spices, and precious gems and minerals motivated European exploration. They will trace the origins of food, fiber, and natural resources early European explorers traded.	Students will illustrate how people seeking to meet their basic needs moved from region to region as resources became scarce. Students will describe examples of immigration and migration in U.S. history.
6-8	Students will determine agriculture's role in the development of civilizations. They will evaluate innovations that increased the availability of food, clothing, and shelter.	Students will explain how expanded trade led to development of industrialized societies. They will evaluate the importance of agricultural commodities in the growth of international trade during the Age of Exploration.	Students will identify historical events that influenced the development of agricultural development. They will describe positive and negative impacts on food and fiber systems, resulting from historical events.
9-12	Students will compare nomadic life to settlements and towns. They will analyze how the barter system evolved and encouraged economic growth, communication, and multiculturalism.	Students will identify nations where international food and fiber involvement exists. They will investigate the impact of global societies on food and fiber systems.	Students will identify the role agriculture played in U.S. development. They will analyze agriculture's role in events that shape the nation.

Standards		Bench-marks
D. Understand the relationship between Food and Fiber Systems and world cultures.	**E. Understand how different viewpoints impact Food and Fiber Systems.**	
Students will discover foods they consume originated from different countries. They will trace foods back to the original country.	Students will realize people live in cities, towns, and rural areas. They will illustrate characteristics of cities, towns, and rural areas.	**K-1**
Students will explain why agriculture influences food and clothing in cultures. They will compare food and clothing among cultures.	Students will determine whether they live in a city, suburb, town, or rural area. They will give examples of contrasting views of Food and Fiber Systems in the community.	**2-3**
Students will identify geographic origins of plants and animals. They will locate current world-production areas of Food and Fiber Systems products.	Students will identify Food and Fiber Systems issues in the community or state. They will contrast different viewpoints of each issue.	**4-5**
Students will explain how geography influences food and fiber production. They will analyze regional geographic characteristics influencing food, clothing, and shelter choices.	Students will summarize national Food and Fiber Systems issues. They will analyze the viewpoints of major stakeholders.	**6-8**
Students will recognize world cultures affect agriculture. They will explain how consumer trends impact Food and Fiber Systems.	Students will compare global issues impacting Food and Fiber Systems. They will justify personal viewpoints based on research.	**9-12**

III. Science, Technology, and Environment

Bench-marks	Standards	
	A. Understand how ecosystems are related to Food and Fiber Systems.	**B. Understand Food and Fiber Systems dependence on natural resources.**
K-1	Students will identify the natural life cycles of plants and animals. They will illustrate life-cycle stages.	Students will identify natural resources. They will illustrate natural resources used by Food and Fiber Systems.
2-3	Students will describe components of an ecosystem. They will illustrate specific components of an ecosystem in the community.	Students will describe renewable and non-renewable natural resources. They will classify natural resources used in the production of food, clothing, and shelter into renewable or non-renewable categories.
4-5	Students will discover ecosystems regenerate. They will analyze the interaction of Food and Fiber Systems with natural cycles.	Students will examine how living organisms transform natural resources into consumer products. They will analyze food, clothing, and shelter to determine the natural resources used.
6-8	Students will discover similarities of ecosystems in the world. They will categorize ecosystems by common characteristics (e.g. topography, climate, soil type and other factors).	Students will identify classes of organisms involved in Food and Fiber Systems. They will explain the roles of these organisms in agriculture.
9-12	Students will identify how Food and Fiber Systems affect ecosystems. They will evaluate the positive and negative impacts of agriculture on ecosystems.	Students will explain why all countries' agricultural systems depend on natural resources. They will evaluate why Food and Fiber Systems compete for natural resources.

Standards		Bench-marks
C. Understand management and conservation practices used in Food and Fiber Systems.	**D. Understand science and technology's role in Food and Fiber systems.**	
Students will define natural-resource conservation. They will describe ways to conserve natural resources.	Students will identify tools and machines used in Food and Fiber Systems. They will give examples of tools and machines used to produce food and fiber products.	**K-1**
Students will identify natural resource-management practices that limit pollution. They will cite agricultural practices used to manage and conserve soil, water, and air.	Students will recognize inventors and their inventions related to Food and Fiber Systemss. They will describe the agricultural importance of the inventions.	**2-3**
Students will identify pest-management practices in Food and Fiber Systems. They will compare alternative and traditional pest-management practices.	Students will explain how technological advancements enhance Food and Fiber Systems' efficiency. They will list technologies that reduce the need for manual labor in agriculture.	**4-5**
Students will identify agencies and policies that regulate natural resources-management and conservation of Food and Fiber Systems. They will determine the impact these policies and regulations on food and fiber systems.	Students will identify Food and Fiber Systems careers dependent on science and technology skills. They will contrast these skills needed for agricultural and non-agricultural careers.	**6-8**
Students will recognize U.S. management and conservation practices impact other countries. They will evaluate the impact of these practices on Food and Fiber Systems in other countries.	Students will recognize how science and technology impact Food and Fiber Systems. They will analyze the effects of science and technology on food, clothing, shelter, and career choices.	**9-12**

IV. Business and Economics

Bench-marks	Standards	
	A. Understand Food and Fiber Systems and economics are related.	**B. Understand Food and Fiber Systems have an impact on local, national, and international economies.**
K-1	Students will recognize agricultural products have monetary value. They will explain how food and clothing are worth money.	Students will identify people in the community who rely on Food and Fiber Systems to make a living. They will connect food and fiber systems to local businesses.
2-3	Students will describe how a shortage or surplus of a product provides an opportunity for trade. They will predict what happens when shortages or surpluses occur.	Students will recognize people responsible for delivering agricultural products to consumers. They will compare jobs performed from production to consumption.
4-5	Students will define agribusiness. They will give examples of agribusinesses in the community.	Students will identify how value is added to raw agricultural products after production. They will compare the value of raw and processed products.
6-8	Students will identify Food and Fiber Systems-related careers. They will compare business and economic skills and educational qualifications for agricultural careers.	Students will identify industries whose inputs are from Food and Fiber Systems. They will evaluate industries to determine the agricultural inputs.
9-12	Students will identify events affecting food and fiber trade. They will analyze the economic impact of these events on food and fiber systems.	Students will identify economic activities generated by Food and Fiber Systems. They will compare how agricultural and non-agricultural businesses influence the economy.

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Standards		Bench-marks
C. Understand government's role in Food and Fiber Systems.	**D. Understand factors influencing international trade of food and fiber products.**	
Not applicable at this level.	Students will recognize food and clothing comes from other countries. They will give examples of food and fiber products from other countries.	**K-1**
Students will recognize the government regulates Food and Fiber Systems. They will classify government functions, including safety, inspection, and grading.	Students will define import and export. They will identify U.S. food and fiber products exported to other countries.	**2-3**
Students will explain the need for government regulation in agriculture. They will give examples of regulations and laws impacting Food and Fiber Systems.	Students will explain why nations trade products and services. They will make a list of agricultural services the U.S. trades with other nations.	**4-5**
Students will recognize the government responds to people's needs related to Food and Fiber Systems. They will evaluate how these responses impact agriculture.	Students will explain "free trade" and "balance of trade." They will compare U.S. food and fiber trade policies to other nations' policies.	**6-8**
Students will identify international Food and Fiber Systems issues. They will analyze the governments' roles of international agricultural issues.	Students will identify factors influencing international trade. They will explain how these factors impact U.S. food and fiber products and services.	**9-12**

V. Food, Nutrition, and Health

Bench-marks	Standards	
	A. Understand Food and Fiber Systems provide nourishment for people and animals.	**B. Understand Food and Fiber Systems provide healthy-diet components.**
K-1	Students will explain people and animals obtain sustenance from Food and Fiber Systems products. They will illustrate products people and animals eat.	Students will identify the parts of the Food Guide Pyramid. They will illustrate a well-balanced meal.
2-3	Students will distinguish between processed and unprocessed foodstuffs people and animals eat. They will compare how common foodstuffs eaten by humans and animals are differently processed.	Students will match food groups with their recommended daily servings. They will plan healthy meals for one day.
4-5	Students will identify ways of processing foodstuffs for people and animals. They will explain reasons for processing foodstuffs.	Students will identify the six basic food nutrients: carbohydrates, protein, water, vitamins, minerals, and fats. They will categorize foods based on nutritional content.
6-8	Students will identify agricultural products in food and feed. They will compare food and feed ingredient labels.	Students will interpret food nutritional labels. They will compare personal food intake to the USDA Food Guide Pyramid recommendations.
9-12	Students will recognize that food and feed products contain additives. They will categorize additives from ingredient labels.	Students will recognize life stages and activity levels change human nutrition requirements. They will construct healthy diet and exercise plans for different life stages and activity levels.

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Standards		Bench-marks
C. Understand Food and Fiber Systems provide food choices.	**D. Understand Food and Fiber Systems promote a safe food supply.**	
Students will recognize how individual preferences affect food selection. They will show where their food preferences fit into the Food Guide Pyramid.	Students will recognize safe food practices. They will illustrate ways to practice food safety.	**K-1**
Students will identify food advertisements. They will explain the relationship between food choice and advertising.	Students will describe safe food handling, preparation, and storage. They will show proper handling, preparation and storage of foods.	**2-3**
Students will explain how factors, such as culture and convenience, affect food choices. They will analyze how food preferences have changed over time.	Students will recognize the government makes food safety policies. They will explain how these policies promote a safe food supply.	**4-5**
Students will explain how food choices are influenced by economics. They will compare food choices based on cost.	Students will recognize food contaminants. They will classify the contaminants that make food unsafe.	**6-8**
Students will describe how research and development influences food choices. They will research new food choices.	Students will recognize factors affecting a safe food supply. They will evaluate how food safety issues impact Food and Fiber Systems.	**9-12**

Capital For Cookies

GRADE LEVEL: 4-5   **SUBJECT:** Economics

ACADEMIC STANDARDS: **THEME:** Business/Production
(3-5) ECO: 1.1, 1.2, 1.4, 1.6

FOOD AND FIBER STANDARDS: I-A, B, C, E; III-D; IV-A,B

LEARNER OBJECTIVE:
Students will learn how land, labor, capital, and enterprise relate to Food and Fiber Systems.

Vocabulary
capital—Things used to produce other goods and services.
enterprise—The business as a whole, particularly the owner who assumes risks and takes responsibility
     for organizing land, labor, and capital.
labor—People who do work in exchange for pay.
land—Ground, along with raw materials such as soil, water, or trees taken from it.

Background
     All economic activity depends on four categories of resources: land, labor, capital, and enterprise.
Each of these is used in some combination with the other to produce the wide range of goods and services
available for us to purchase.
     Agriculture is an essential form of enterprise since it uses land, labor, and capital to produce the raw
materials needed for existence: grains, meat, fruits and vegetables, milk, and many by-products, along
with fiber and lumber. For example, Texas farmers are some of the most efficient producers of food and
fiber. The farmers or ranchers produce things that are most suited for their geographic area. Timber in
East Texas; cotton and cattle in the Plains and Panhandle; cotton and sheep along the border; cattle and
poultry in the Central area, and rice and cattle along the Gulf Coast. The Metroplex area around Dallas
and Fort Worth is the center of economic capital, providing financing for many factors of production.

Step-By-Step Instructions
1. Using background information, relate and discuss concepts of land, labor, capital, and enterprise.
   Write the definitions for each word on the board.
2. Pass out Activity Sheet A. Read the information together as a class, then have students write the
   words under the appropriate headings.

Answer Key

Capital	Enterprise	Labor	Land
advertising*	advertising*	bakers	Real estate
bank loan	cookies	cashier	
building	packaging*	delivery drivers	
checking account	recipe	the Yamamotos*	
eggs	the Yamamotos*		
flour			
mixing bowls			
ovens			
packaging*			

3. Words with * fit in more than one area. Discuss with the students why these items could be included under more than one heading.
4. Challenge the students to explain why a cookie producer could be considered a part of Food and Fiber Systems or Agriculture.

Related Activties
1. Discuss the various enterprises, capital, labor sources, and land in your community. Examine how each of those relates to the Food and Fiber System.
2. Have students write a story about a company they would open in the community. What would it produce and what resource inputs would it need?
3. Let the class create a company to make an agricultural product. As a class they should decide how to organize the company and where they will attain the necessary resources to be successful.
4. Discuss the significance of human resources. Why is it essential for a company to have officers and managers? Are the managers and supervisors more important than the workers? What happens if the leaders don't do their jobs? What happens if the workers don't do their jobs?
5. Use the library and Internet to research natural resources of your region and their economic impact.

Resources

Student Books
Adams, B. J. (1992). The Go-Around Dollar. Macmillan.
Brittain, B. (1979). All the Money in the World. Harper Collins.
Byers, P. & Preston, J. (1983). The Kids' Money Book. Liberty.
Cook, J. & Bond, S. (1988). Where Food Comes From. EDC.
Elkin, B. (1983). Money. Children's Press.
Horowitz, J. (1986). Night Markets: Bring Food to the City. Harper Collins.

Teacher Resources
"Food for America," National FFA Supply Service, 5632 Mt. Vernon Memorial Highway, Alexandria, VA 22309. (teaching guide with activities, $7.50 per kit).

Related Internet Websites
The United States Department of Agriculture *http://www.usda.gov*
The National Agricultural Statistics Service, production statistics for livestock and crops produced in the U.S. *http://www.usda.gov/nass*
The Chicago Mercantile Exchange website: *http://www.cme.com/*

Evaluation
Were students able to correctly categorize resources as capital, enterprise, labor, or land?

Acknowledgement
This lesson was adapted from Texas Ag in the Classroom, Texas Farm Bureau, P.O. Box 2689, Waco, TX 76702-2689.

A Guide to Food and Fiber Systems Literacy

Capital for Cookies

Mr. and Mrs. Yamamoto want to begin a cookie baking business using Mr. Yamamoto's mother's cookie recipe. They have already decided to name their business Yamamoto's Yummies. However, before they can begin selling cookies there are several things they must have. Besides flour, sugar, butter, and eggs, they must have a building, mixing bowls, cookie sheets, ovens, packages to put the cookies in, and people to help in the process of making cookies. The money to purchase all these things is known as capital resources.

The Yamamotos must have a place to put their cookie baking business. They will need to purchase land on which to build their business. Mr. and Mrs. Yamamoto will also have to employ people to mix dough, bake cookies, package cookies, and sell cookies. These people are referred to as labor. Enterprise is a term to describe the whole business, including the building, equipment, employees, and even the idea to make and sell cookies.

Mr. and Mrs. Yamamoto need your help in categorizing the list of items below into the proper category. Rewrite the words under the headings.

advertising   eggs
bakers   flour
bank loan   mixing bowls
building   ovens
cashier   packaging
checking account   real estate
cookies   recipe
delivery driver   the Yamamotos

Capital	Enterprise	Labor	Land

Activities for AITC State Directors

✓ Select teacher/classrooms to be included in this study
- Treatment group: teachers with training in AITC and implementers of the program.
- Control group: teachers with no training or contact with AITC and teaching in schools that are demographically similar to schools in the treatment group.
- Ascertain number of students to be tested so that we can know the number of tests to provide (2 classes at each of the seven grade levels, K-6, for the treatment group; and 2 classes at each of the seven grade levels, K-6, for the control group).

✓ Contact administrators and obtain their signatures on provided consent forms.

✓ Organize a schedule for data collection at each school site.
- Pretest: September – October, 2001
- Posttest: March – April, 2002
- Our project staff will assist you at the first school site.
  - To deliver testing materials
  - To review data collection procedures
  - To assist with initial data collection

This is an important first step in identifying contributions AITC has made to increasing student agricultural knowledge. Your participation in this project is greatly appreciated and should benefit both the national direction of the AITC program, as well as AITC at the state level. Summaries of the findings will be provided for individual participating states and for the project as a whole.

Consent Form - Administrators

I, _____, _____(job title) of

_____(school) am consenting to allow researchers from Oklahoma State University

access to our Kindergarten through Sixth Grade classrooms so that students may participate in a study

titled *The Impact of Selected Agriculture in the Classroom Teachers on Student Agricultural*

Knowledge conducted by James G. Leising, Seburn L. Pense and Matthew T. Portillo. This study is

designed to assess food and fiber knowledge of elementary school students.

I have reviewed the methodology of this study and understand that students will be asked to

take a written pre- and posttest (Fall, 2001 & Spring, 2002) about the many aspects of agriculture and

it's connection to our society and the world at large.

I understand that student responses to the test questions are anonymous, and that the only

persons who will see the individual test results will be Dr. James Leising, Mr. Seburn Pense, and Mr.

Matthew Portillo, who will report the results as group data only.

It is understood that participation is voluntary, and that a student may withdraw at any time

with no penalty.

It is further understood that there will be no harmful effects by participating in this study.

Thank you for your participation!

_____   _____
Signature   Date

Evaluation Guidelines

The accompanying tests were developed for evaluating student progress of Food and Fiber Systems knowledge, based on the Food and Fiber Systems Literacy Standards and Benchmarks. The questions on each instrument directly relate to the respective grade-group benchmarks. The corresponding standard and benchmark are listed next to each test question on the accompanying answer keys.

Assessment Process
We recommend the tests be given three times within the grade groups for which they are intended. A pre-test should be given to assess existing student knowledge of Food and Fiber Systems and to help the teacher in determining appropriate instruction to achieve the standards. Each test should be given again near the midpoint of the grade grouping as a formative evaluation and to determine needed remediation within the themes and standards. The third, or summative, administration should be near the end of the grade grouping to assess mastery of benchmarks within the grade grouping.

     Example – K-1 Grade Grouping
     Pretest – soon after beginning of Kindergarten year
     Formative test – near end of Kindergarten year or soon after beginning of 1st grade year
     Summative test – February or March of 1st grade year

During pilot testing we learned students are apprehensive about taking the pretest because it includes material they have not yet covered. It helps to assure students the pretest in no way affects their classroom grades. However, teachers may want to incorporate or tie the summative test results, especially of older students, to recorded and reported scores. This may help motivate the students to take the test more seriously.

Teacher/Student Instructions
Teacher or student instructions, as appropriate, are printed on the cover page of each test instrument.

Who can use the test
The copyright holder grants permission to the purchaser of these evaluation instruments to duplicate the instruments as necessary for the express purpose of assessing student knowledge and achievement relating to Food and Fiber Systems literacy in their school.

K-1 Answer Key

Corresponding Standard and Benchmark are in bold type.

1. **I-A**   cheese to dairy cow, bacon to pig, pecans to tree, eggs to chicken, bread to wheat

2. **I-B**   wool sweater to sheep, leather boots to cow, denim jeans to cotton, books to tree

3. **I-C**   milk to dairy farm, meat to beef cattle ranch, hot dog buns to wheat farm

4. **I-D**   bakery to wheat, florist shop to flower, home builder to tree

5. **I-E**   pictures of florist, cook and auctioneer should be circled

6. **II-A**   picture of tree should be circled

7. **II-B**   Thanksgiving picture should be circled

8. **II-C**   Pilgrim to farmer

9. **II-D**   picture of fortune cookies and tacos should be circled

10. **II-E**   red circles around freeway and museum; blue boxes around windmill and tractor

11. **III-A**   red circle around "plant seeds" picture; blue box around "water" picture

12. **III-B**   picture of rain and sunlight should be circled

13. **III-C**   "turn off lights" and "pick up trash" pictures should be circled

14. **III-D**   bread to combine, ice cream to milking machine, clothes to sewing machine

15. **IV-A**   groceries to money

16. **IV-B**   pictures of baker and mechanic should be circled

17. **IV-D**   pictures of coffee and bananas should be circled

18. **V-A**   girl to pancakes, steak and popcorn; horse to hay and oats

19. **V-B**   boy to fish and apple

20. **V-C**   muffins to bottom row, grapefruit to right side second row, eggs and bacon to right side third row, milk to left side third row

21. **V-D**   refrigerator to eggs, soap to hands, turkey to oven

2-3 Answer Key

Corresponding Standard and Benchmark are in bold type

1. **I-A**   food to steer, lobster, vegetables and fruit; clothing to fabric; shelter to trees

2. **I-B**   1) production, 2) processing, 3) distribution, 4) marketing, 5) consumption

3. **I-C**   food to rancher and grocer; clothing to fashion designer and dry cleaner; shelter to carpenter and logger

4. **I-D**   land to camping, houses, mining, and crops; air to medical oxygen; water to swimming, boating, and irrigation

5. **I-E**   pictures of chef, veterinarian, auctioneer, and plant scientist should be circled

6. **II-A,B**   horse-drawn plow to 100 years ago; men with hoes to 1000 years ago; tractor and planter to 1 year ago

7. **II-D**   USA to hamburger; Germany to lederhosen; Mexico to tacos; Scotland to kilt, China to fortune cookies

8. **II-C**   "migrating with wildlife herds", "clothing of animal skins", "fish to fertilize corn", and "relied on native plants and animals" connect to American Indians; "oxen to pull farm implements", "clothing of cotton or wool", "brought new plants and animals" connect to Early American Settlers

9. **II-E**   1) city, 2) suburb, 3) town, 4) rural

10. **III-A**   rivers, air, wildlife, trees, and soil should be circled

11. **III-B**   Renewable – wildlife, soil, water, trees, air; Non-Renewable – crude oil, sunlight, coal

12. **III-C**   turn off lights, ride bicycles, plant trees, and recycle should be circled

13. **III-D**   Whitney to cotton gin, Carver to peanut butter, Deere to steel plow

14. **IV-A**   surplus, shortage, shortage, surplus

15. **IV-B**   pictures of planting, irrigating, and harvesting should be circled; pictures of refining, storing, and packaging should have an X

16. **IV-C**   grading eggs, inspecting grocery stores, and food safety should be circled

17. **V-A**   pictures of celery, oat bran muffins and steak should be circled; pictures of cotton seed and soybeans should have an X

18. **IV-D**   cocoa, coffee, and vanilla should be circled; corn, soybeans, and wheat should have an X

19. **V-B**   A) milk, yogurt & cheese; B) bread, cereal, rice, & pasta; C) vegetable; D) fruit; E) fats, oils and sweets; F) meat, poultry, fish, dry beans, eggs, & nuts

20. **V-C**   raisins, breakfast cereal, milk, and beef should be circled; writing paper, seafood, grapes, and okra should have an X

21. **V-D**   canned food to safely stored in pantry; fresh milk to always stored in refrigerator; ground meat to always cook to well-done; fresh fruit to always wash before eating

4-5 Answer Key

Corresponding Standard and Benchmark are in bold type

1. **I-A**   rivers, forests, oceans, rangeland, and soil

2. **I-B**   soil, water, energy, and air

3. **I-C**   wheat and cattle

4. **I-D**   traders, explorers, and colonists

5. **I-E**   grocery clerk

6. **II-A**   hunting and gathering

7. **II-B**   spices and precious gems

8. **II-C**   M – Oregon Trail, following buffalo, 1930's dust bowl, and retiring to Florida;
               I – Ellis Island and landing at Plymouth Rock

9. **II-D**   (5) sugar cane; (3) cranberries; (6) bananas; (4) rice; (1) tobacco; and (2) wheat

10. **II-E**   price of imported cars

11. **III-A** water

12. **III-B** air, water, and soil

13. **III-C** to protect plants from harmful insects

14. **III-D** technology

15. **IV-A**   floral shop, bakery, pet store, and lawn service

16. **IV-B**   fresh apples

17. **IV-C**   pesticide use

18. **IV-D**   reduce commodity surpluses

19. **V-A**   improve taste

20. **V-B**   sugar

21. **V-C**   more processed foods

22. **V-D**   government policy

6-8 Answer Key

Corresponding Standard and Benchmark are in bold type

1. **I-A**   1) determine market; 2) harvest; 3) process raw product; 4) distribute to stores;
             5) consume the product

2. **I-B**   marketing, distribution, processing, regulation, and research

3. **I-C**   United States

4. **I-D**   food supply

5. **I-E**   professional

6. **II-A**   (c) irrigation; (a) engines; (d) keeping foods safe; (b) less insect or disease damage

7. **II-B**   farming

8. **II-C**   U.S. Civil War, invention of personal computers

9. **II-D**   Australia

10. **II-E**   Federal Housing Authority

11. **III-A** climate and geography

12. **III-B** bacteria

13. **III-C** Environmental Protection Agency

14. **III-D** (c) chemical analysis; (a) feed cost analysis; (b) nursery manager; (d) vaccinations

15. **IV-A**   accounting, time management, small engine repair, human relations,

16. **IV-B**   (d) cosmetic industry; (c) dairy industry; (b) organic fertilizer industry; (a) pulp trees

17. **IV-C**   control the import of plant and animal pests

18. **IV-D**   agreement allowing free trade between Canada, the U.S. and Mexico

19. **V-A**   roasted peanuts

20. **V-B**   88

21. **V-C**   meal #4

22. **V-D**   mold, bone chips, bacteria
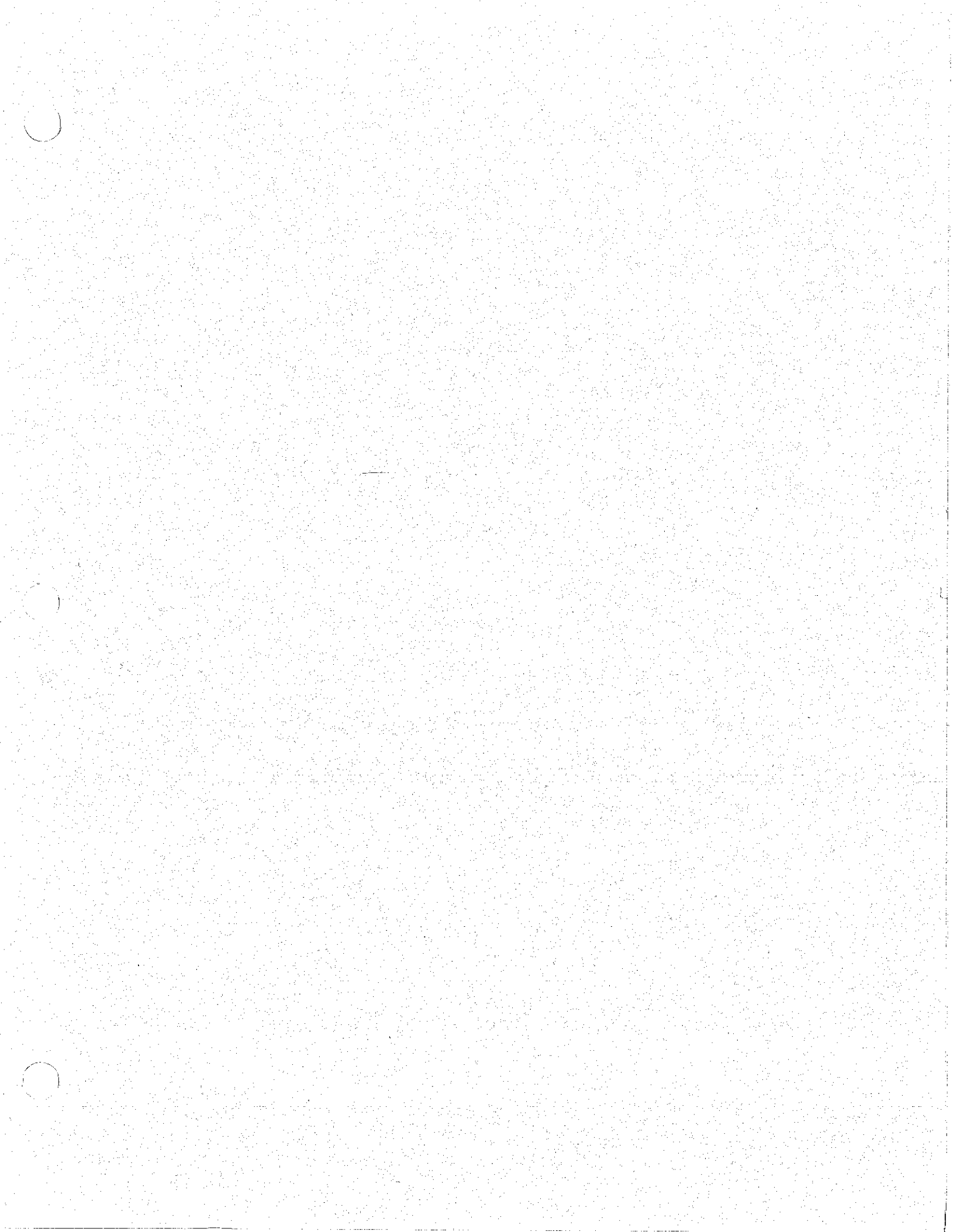
Literacy Tests

For Grades K-1, 2-3, 4-5, and 6-8

Carl G. Igo, James G. Leising, Martin J. Frick,
Daniel J. Hubert, and Alexander M. Malcolm

Food and Fiber Systems Literacy
Department of Agricultural Education and Communications
Oklahoma State University
Stillwater, OK 74078

Food and Fiber Systems Literacy Test
for Students in Grades K-1

Teacher Instructions: This instrument consists of 21 questions, incorporating words and picture recognition. Have your students follow along as you read each question, then assist the students in marking their response choices. If your students have trouble understanding the words or pictures, you may assist them. Use your own discretion as to how much of the instrument to administer at one time. You may spread the test out over several days.

1. Draw a line from each food to the plant or animal the food comes from

cheese

tree

bacon

pig
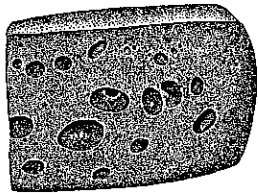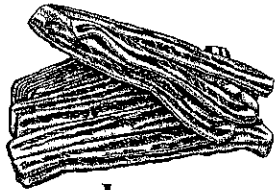
pecans
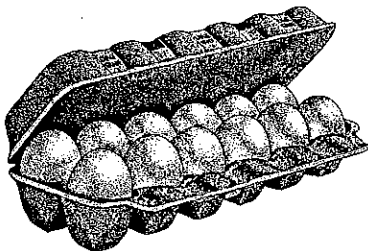
dairy cow

eggs
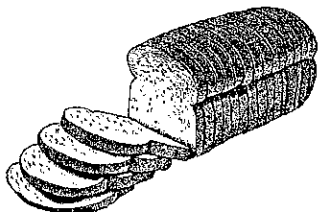
wheat

bread
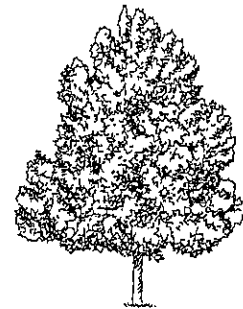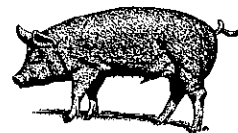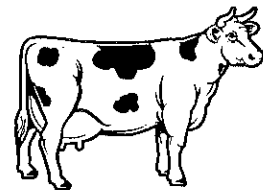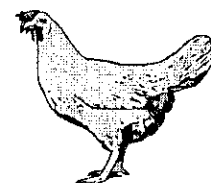
chicken

2. Draw a line from the product in the first row to the plant or animal it comes from in the second row

wool sweater   **leather boots**   **denim jeans**   **books**
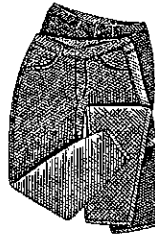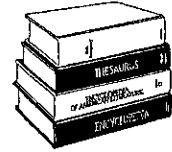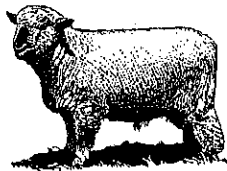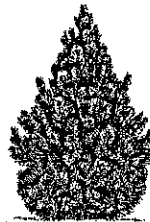
cotton   **sheep**   **tree**   **cow**

3. Draw a line from the product in the first row to the kind of farm it comes from in the second row
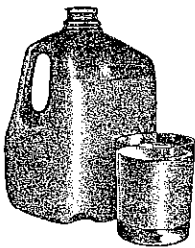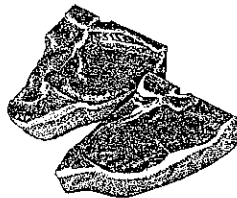
milk   **meat**   **hot dog buns**
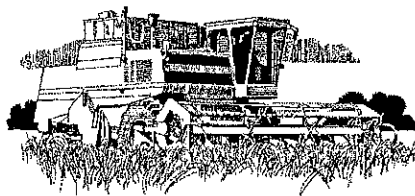
beef cattle ranch   **wheat farm**   **dairy farm**

4. Draw a line from the business in the first row to the food and fiber product in the second row used by that business

bakery

florist shop

home builder

flowers

trees
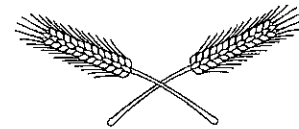
wheat

5. Circle the pictures of people doing agricultural work
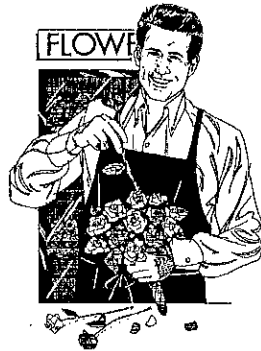
6. **Circle the agricultural product people use to make shelters**
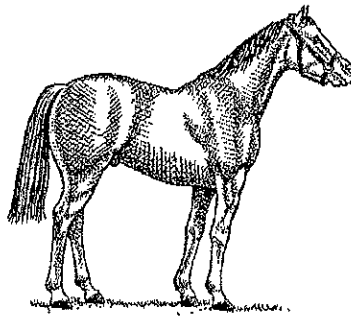
tree   horse   pumpkins

7. **Circle one picture that represents a special day celebrating the importance of agriculture**

Easter   Thanksgiving   Valentine's

Christmas   St. Patrick's   Independence Day

8. **Draw a line connecting the Pilgrim to the way most early Americans made a living**

farmer

firefighter

grocer

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9. **Circle the pictures showing foods that came from a different country**

fortune cookies

ice cream
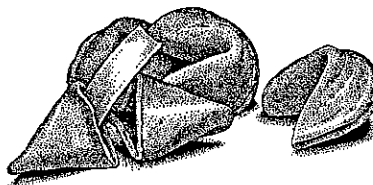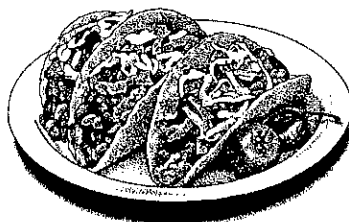
tacos
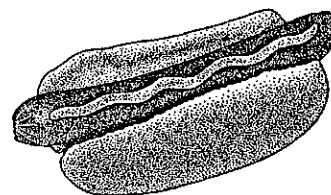
hotdog

10. Draw red circles around the pictures of things you would find in a city

Draw blue boxes around the pictures of things you would find on a farm
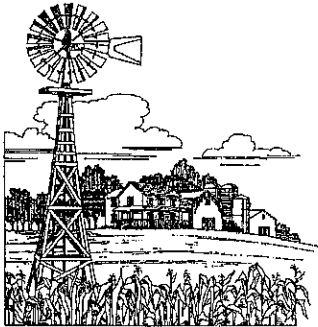
windmill
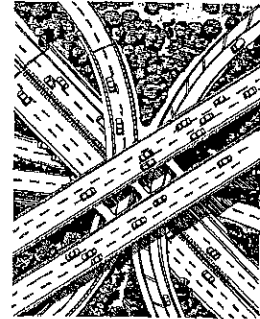
freeway

museum
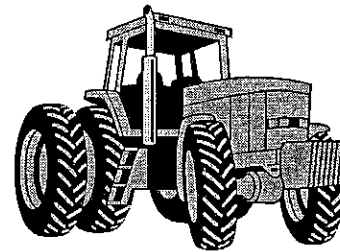
tractor

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11. Draw a red circle around the first thing that you must do to grow a plant

Draw a blue box around the next thing you must do
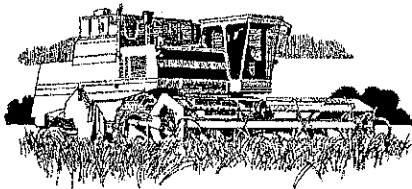
harvest

water
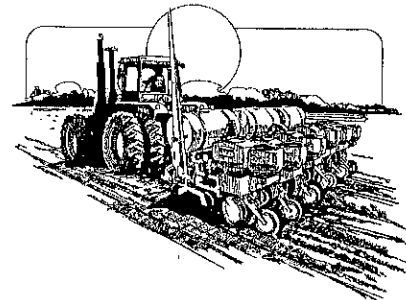
plant seeds

12. Circle the pictures of things plants must have to grow
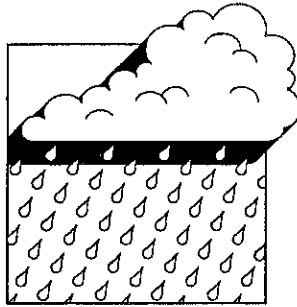
rain
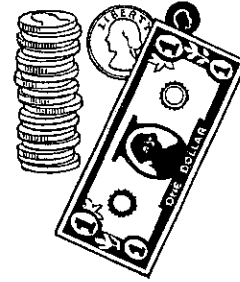
money
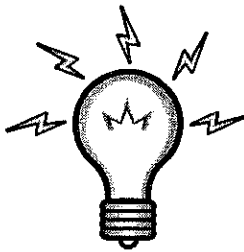
electricity
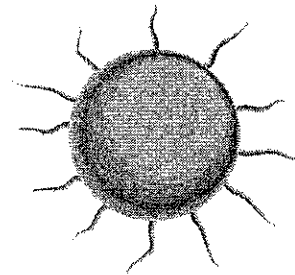
sunlight

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13. Circle the pictures showing a way to conserve natural resources
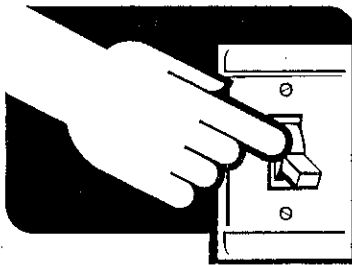
turn off lights

pick up trash

go camping

14. Draw a line from the food and fiber systems product to the machine that helps people make that product
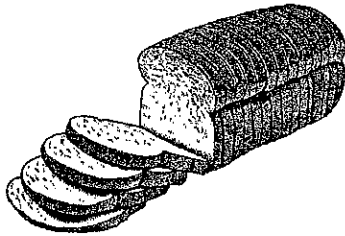
bread

ice cream

clothes
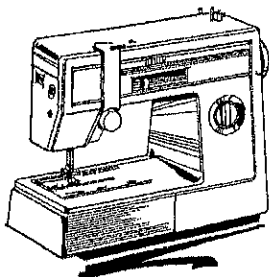
sewing machine
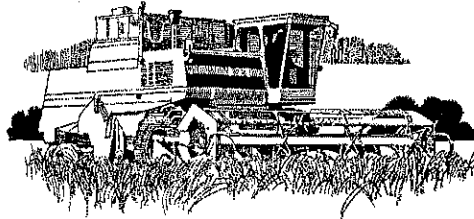
combine

milking machine

15. Draw a line connecting the groceries to what you would use to pay for food

beads
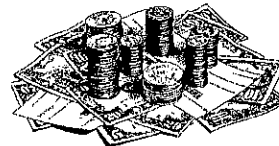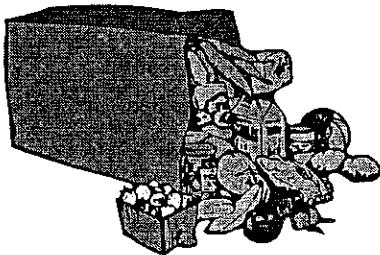
money

cloth

16. **Circle the pictures showing people who earn money from food and fiber systems**
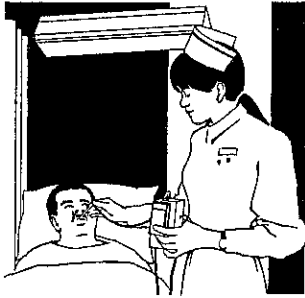
nurse

baker
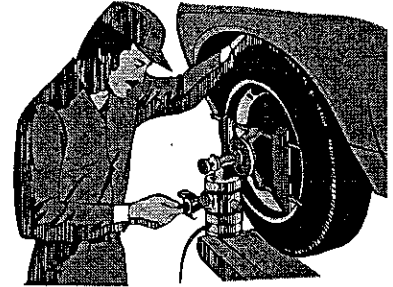
mechanic

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17. **Circle the pictures showing food and fiber products from other countries**

coffee
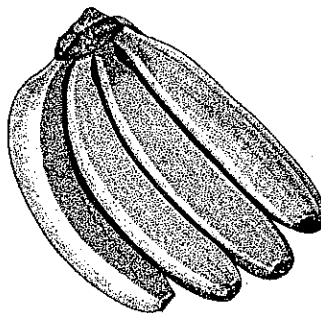
bananas
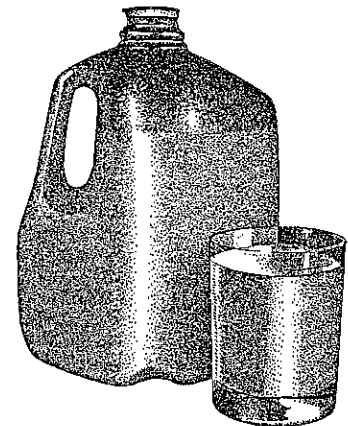
milk

18. **Draw a line from the girl to the foods people eat**
    Draw a line from the horse to feeds animals eat
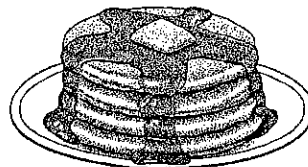
pancakes
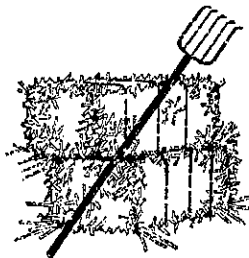
hay
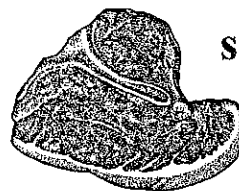
steak
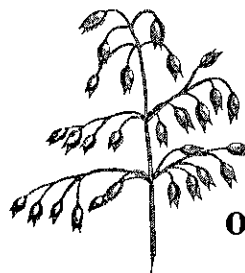
oats
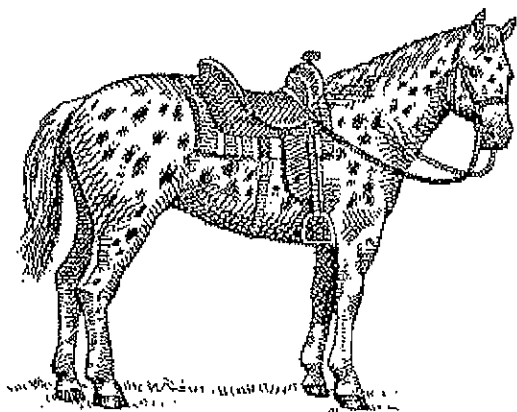
popcorn

19. Draw a line from the boy to the nutritious foods
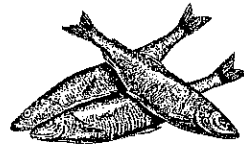
fish
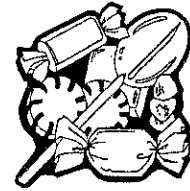
candy
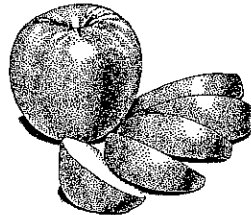
apple
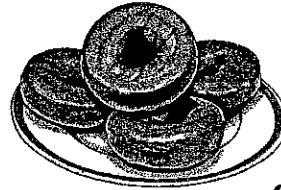
donuts

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20. Draw a line from the breakfast foods to where they fit on the Food Guide Pyramid
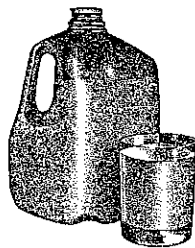
bacon

milk
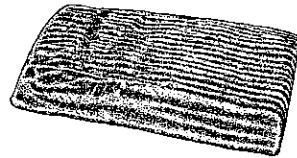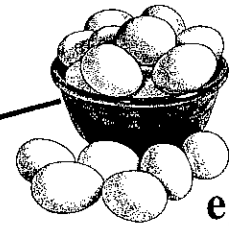
eggs

muffins
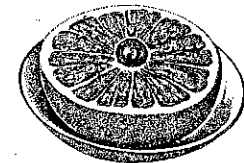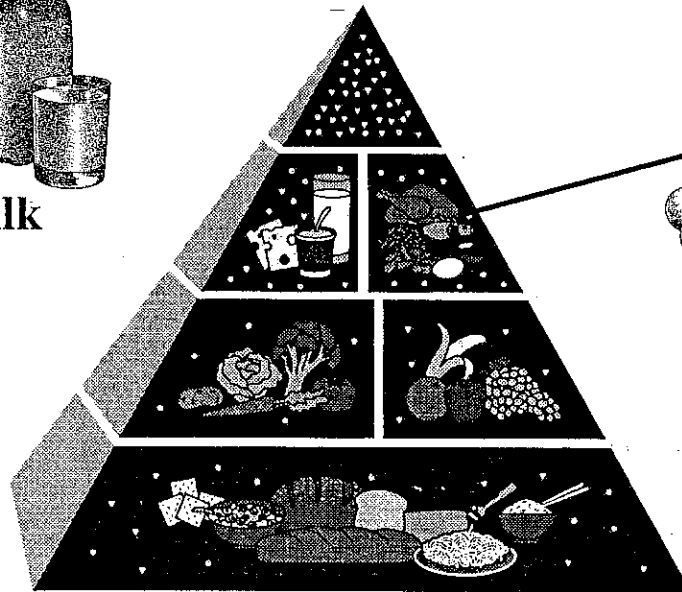
grapefruit

21. Connect the pictures in the first column to pictures in the second column to show ways you can practice food safety
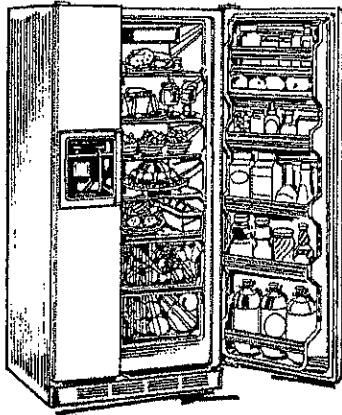
refrigerator

hands

soap
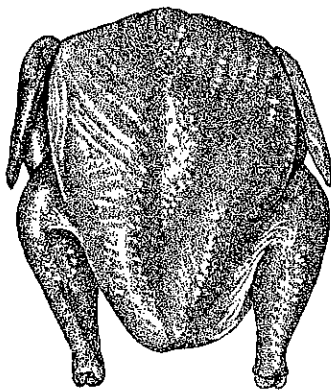
oven

turkey
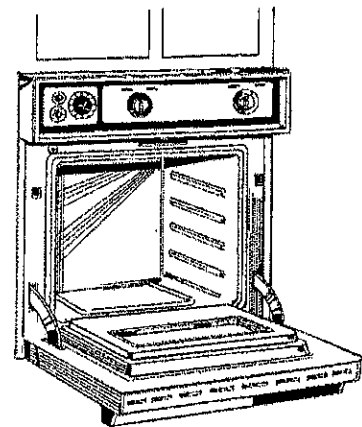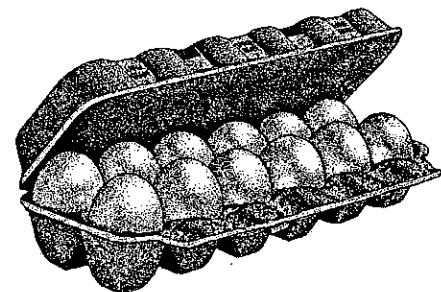
eggs
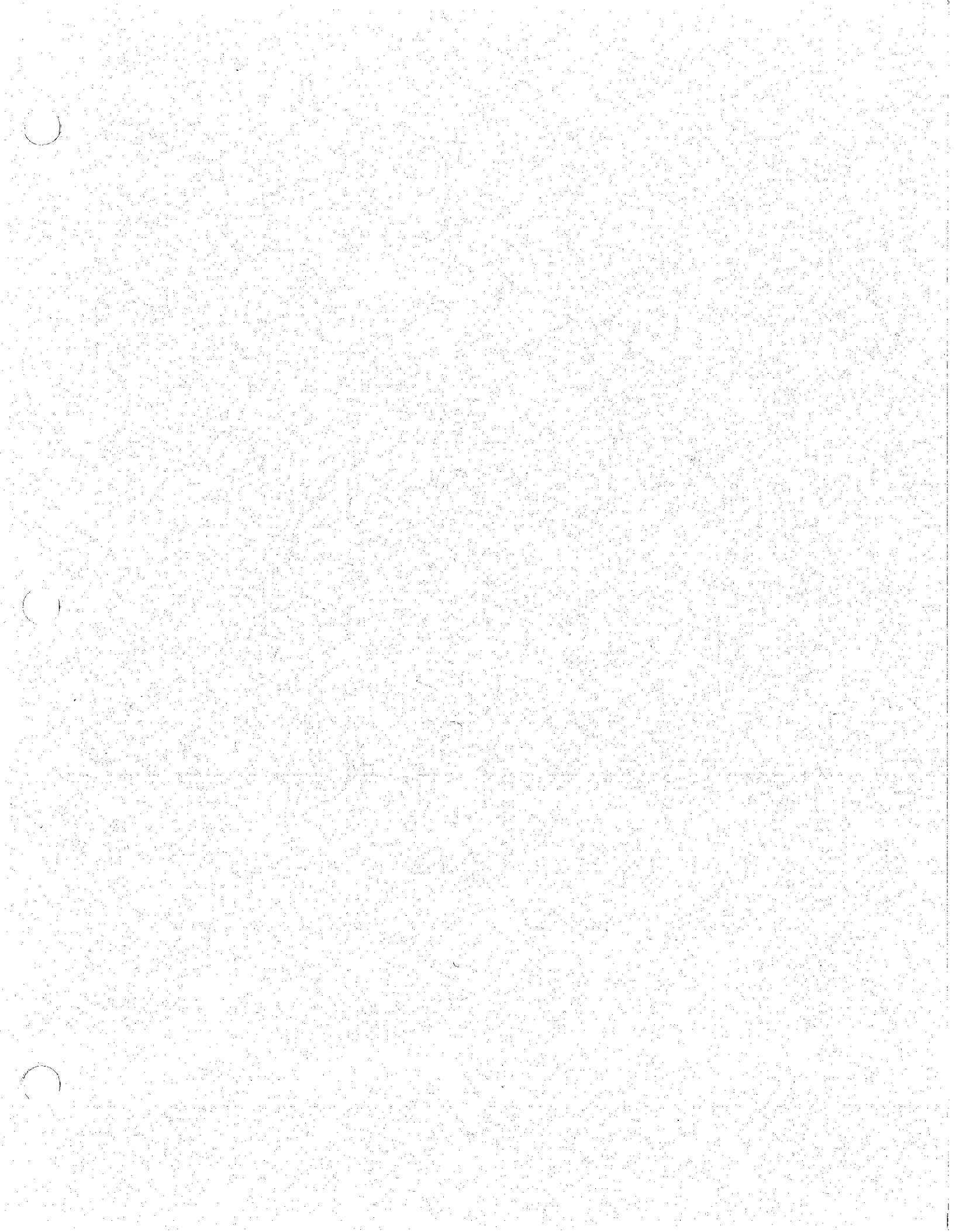
Food and Fiber Systems Literacy Test
for Students in Grades 2-3

Teacher Instructions: This instrument consists of 21 questions incorporating both word and picture recognition. Have your students follow along as you read each question, then assist the students in correctly marking their response choices. If your students have trouble understanding words or pictures, you may assist them. Use your own discretion as to how much of the instrument to administer at one time. You may spread the test out over several days.

1. **Match the food and fiber product in the first column to what it is primarily used for in the second column.**

steer

Food
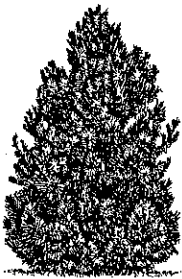
trees

Clothing

lobster

vegetables and fruit

Shelter
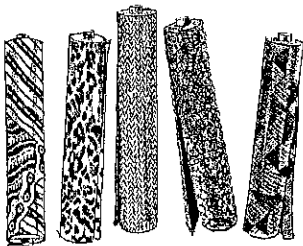
fabric

2. **Rank the items below in order (1-5) from the producer to the consumer.**
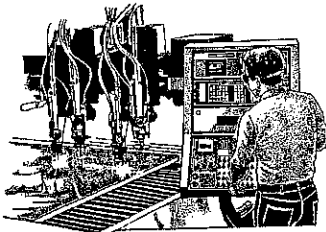
[ ] Processing
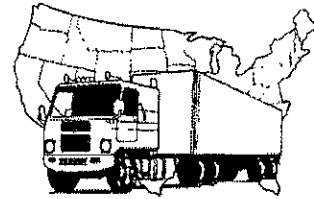
[ ] Distribution

[ ] Consumption

[ ] Marketing
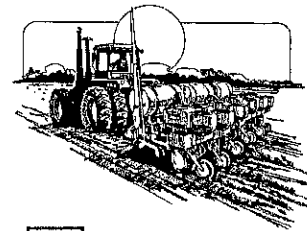
[ ] Production

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3. **Connect the people pictures to the food and fiber systems area they work in.**

Food

Clothing

Shelter

fashion designer

carpenter

rancher

grocer
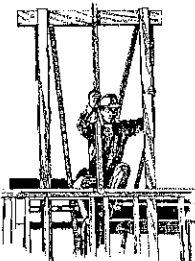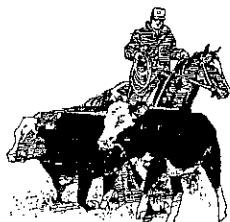
dry cleaner

logger

4. Connect the natural resource to the way it is used.
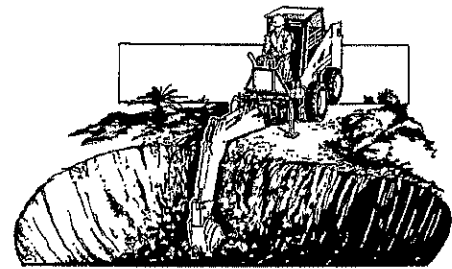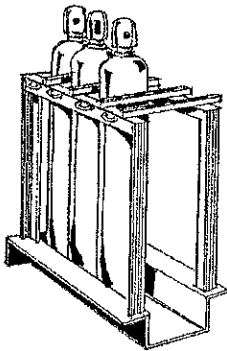
camping

land

houses

swimming

air
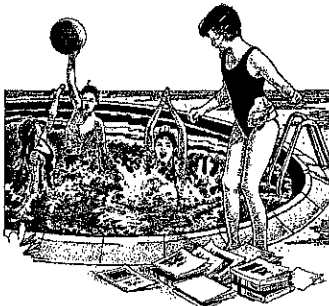
mining

medical oxygen

boating

water
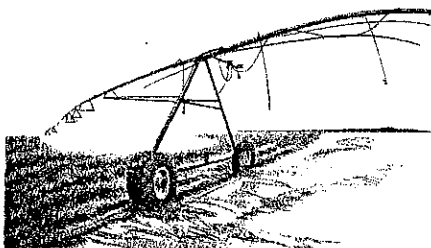
irrigation

crops

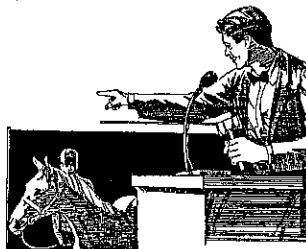**5.** **Circle the pictures of people with food and fiber related careers.**

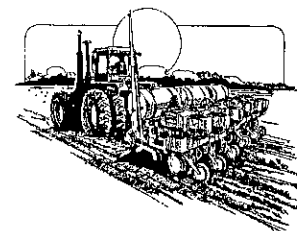|		
Chef	Veterinarian	Police
Doctor	Auctioneer	Plant Scientist

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6. **Connect the planting practice with the correct time period.**
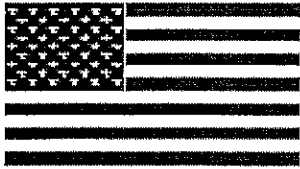
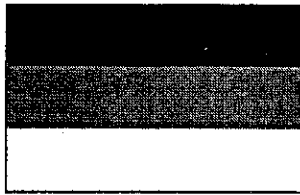1 year ago   100 years ago   1000 years ago

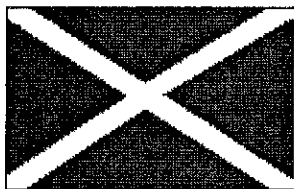7. **Connect each nation's flag to the food or clothing from that country.**

USA

Germany

Mexico

Scotland
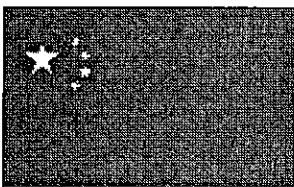
China

kilt
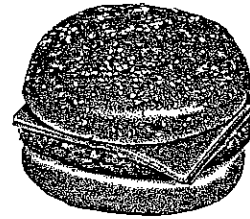
hamburger
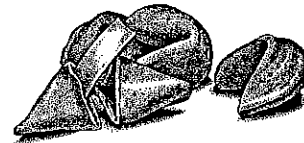
fortune cookies

lederhosen
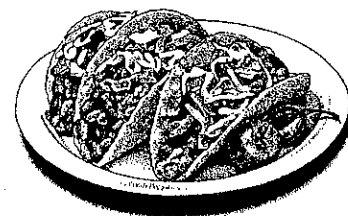
tacos

8. **Draw an arrow connecting the agricultural practice to the correct line under American Indians or early settlers.**

American Indians   **Early American Settlers**

migrating with wildlife herds

oxen to pull farm implements ———————→

clothing of cotton or wool

clothing of animal skins

fish to fertilize corn

relied on native plants and animals

brought new plants and animals

9. **Rank the communities in order (1-4) from the largest to the smallest.**

town ☐   suburb ☐

rural ☐   city ☐

10. Circle the parts of an ecosystem.

rivers

oil wells   air

(soil)   wildlife

trees   factories

pollution   pets

houses

---

11. Classify the natural resources from the word bank as renewable or non renewable.

crude oil	water	trees	coal
soil	sunlight	air	~~wildlife~~

<u>Renewable</u> | <u>Non Renewable</u>
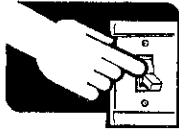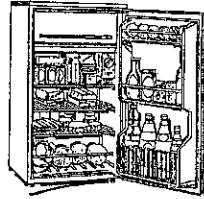
wildlife

12. Circle the pictures showing natural resource conservation practices.

turn off lights

leave refrigerator door open
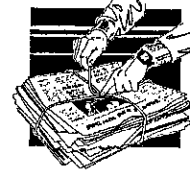
ride bicycles

plant trees

water ski

recycle

13. Match the inventors with their inventions.

Eli Whitney

George Washington Carver

John Deere

peanut butter
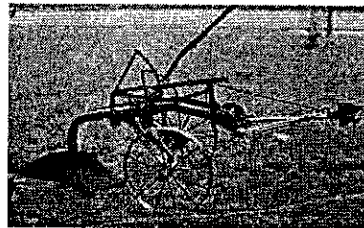
steel plow
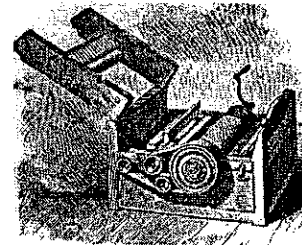
cotton gin

14. Circle the correct word to complete each sentence.

If wool clothing goes out of style there will be a _____ of wool.

shortage   surplus

. . . .

If a new use for chicken feathers is discovered there will be a _____
of feathers.

shortage   surplus

. . . .

If the wheat harvest is small because of drought there will be a _____
of wheat.

shortage   surplus

. . . .

If people eat less pork there will be a _____ of pork.

shortage   surplus

15. Circle the things a farmer does to produce a product.

Put an X through the things the processor does.

planting
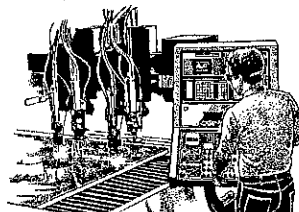
refining
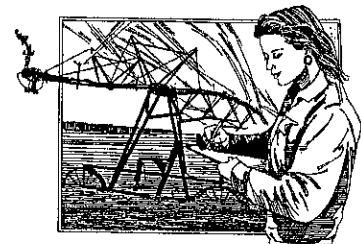
irrigating

storing
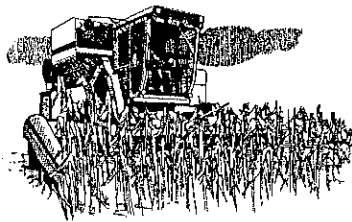
harvesting
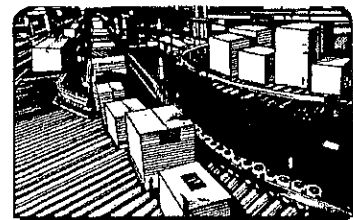
packaging

16. Circle the words describing roles of government in food and fiber systems.

grading eggs   growing watermelon

inspecting grocery stores

food safety   selling cotton

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17. Circle the foods people eat.

Put an X through the feeds animals eat.
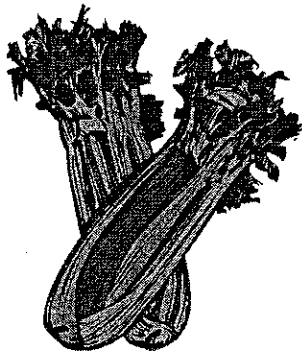
celery

oats

soybeans

oat bran
muffins
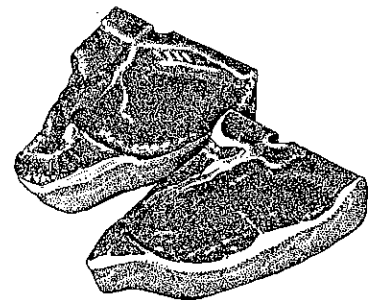
steak

18. Circle the food and fiber products the US imports.

Put an X through the food and fiber products the US exports.

cocoa   coffee   corn

soybeans   vanilla   wheat

---

19. Match the recommended daily serving to the food groups.

A. 2-3 servings per day   D. 2-4 servings per day
B. 6-11 servings per day   E. use sparingly
C. 3-5 servings per day   F. 2-3 servings per day

Fats, Oils, &
Sweets

F
Meat,
Poultry, Fish,
Dry Beans, Eggs,
& Nuts Group

Milk, Yogurt,
& Cheese Group

Vegetable Group   Fruit Group

Bread, Cereal, Rice,
& Pasta Group
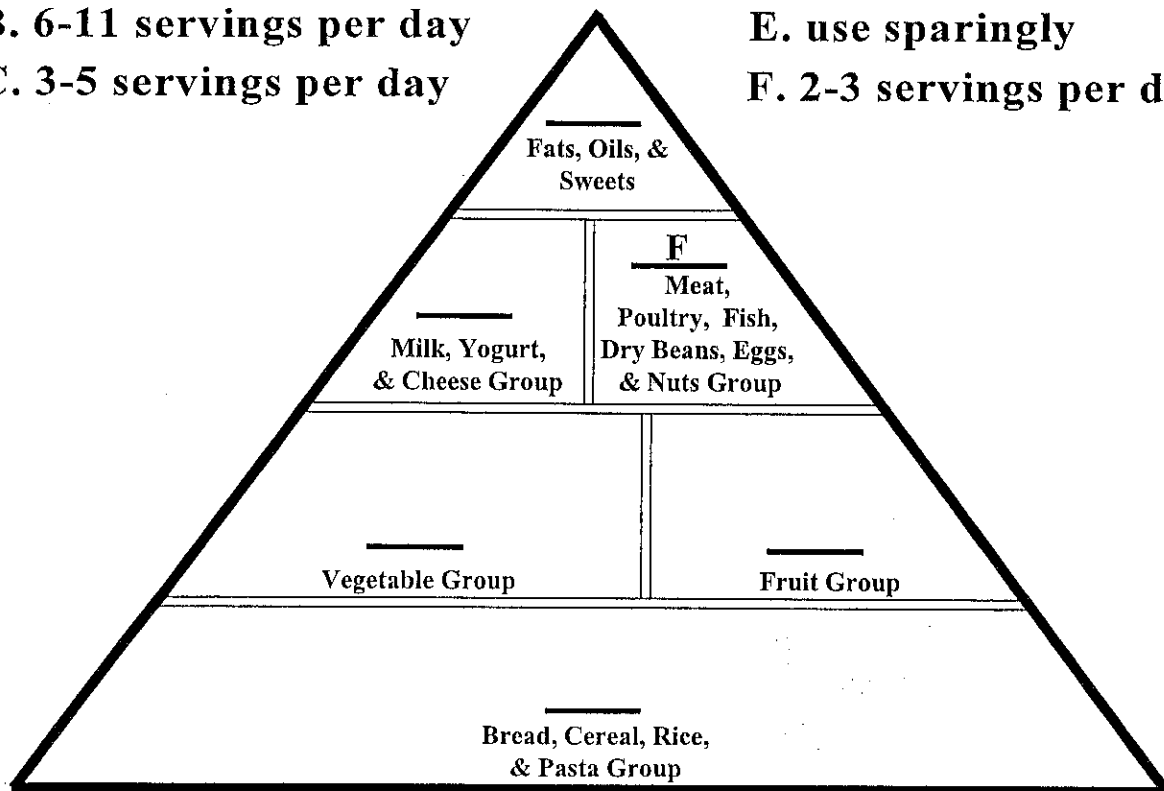
20. Circle the products you see advertised.

Put an X through the products you don't see advertised.

writing paper   raisins   breakfast cereal   milk

seafood   beef   grapes   okra

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21. Connect the food to the way it is safely handled, prepared, or stored.

canned food   always stored in refrigerator
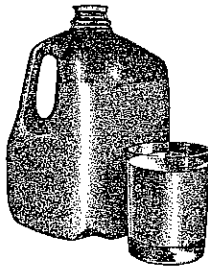
fresh milk   always wash before eating

ground meat   safely stored in pantry
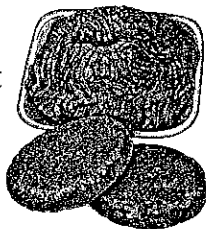
always cook to well-done

fresh fruit
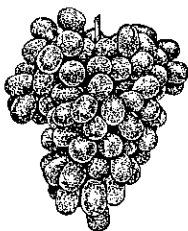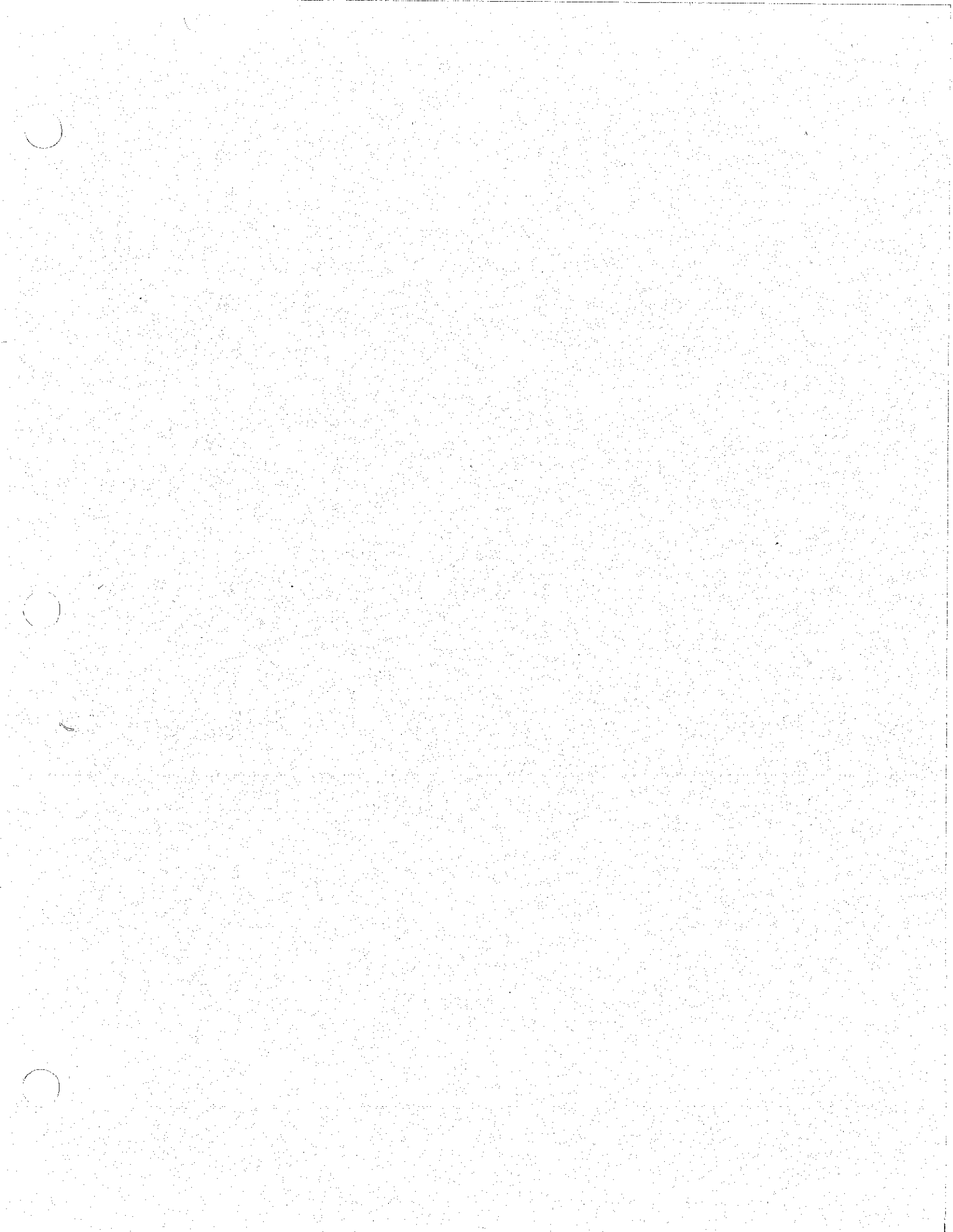
Food and Fiber Systems Literacy Test
for Students in Grades 4-5

Student Instructions: The following pages contain 22 questions about Food and Fiber Systems. Please read each question carefully and choose the correct answer or answers. Use a pencil to mark all answers. If you decide to change an answer, carefully and completely erase the incorrect response. If you do not understand a question, you should ask your teacher for help.

1. Circle **five** natural resources in the list below.

    Rivers   Crops   Soil

    Forests   Rangeland   Labor

    Oceans   Machinery   Corn

2. Circle the **four** natural resources farmers manage.

    Soil   Rainfall   Temperature   Air

    Water   Energy   Coal   Rocks

3. Circle the answer with two of the most common agricultural commodities produced in the United States.

    Oats and Pigs   Wheat and Cattle

    Rice and Chickens   Barley and Sheep

4. From the list below, circle all the groups that brought agricultural products to the new world.

    Traders   Colonists

    Explorers   American Indians

5. Circle the job that is related to food and fiber systems.

Movie Producer   Grocery Clerk

Minister   Librarian

6. Nomadic societies relied on _____ and _____ for their food.
   (Circle the correct answer)

   gardens and crops   farmers and ranchers

   hunting and gathering   milking cows and raising chickens

7. Christopher Columbus and other early explorers traveled the world in search
   of _____ and _____. (Circle the correct answer)

   spices and precious gems   wild horses and cattle

   pirate ships and treasures   cotton and corn

8. Place an **M** next to the actions representing people migrating.
   Place an **I** next to the actions representing people immigrating.

   _____ The Oregon Trail   _____ Ellis Island

   _____ Following Buffalo   _____ Retiring to Florida

   _____ 1930's Dust Bowl   _____ Landing at Plymouth Rock

9. Match the food and fiber product on the left with the state, region, or country that produces it.

Product	State, Region, or Country
_____ Sugar Cane	1. Kentucky
_____ Cranberries	2. Great Plains
_____ Bananas	3. New England
_____ Rice	4. Japan
_____ Tobacco	5. Hawaii
_____ Wheat	6. Carribean

10. Circle the issue that does **not** affect food and fiber systems.

Clean water   Price of imported cars

Air pollution   Export taxes

11. Food and agriculture systems rely on which natural cycle? (Circle the correct answer)

Political   Heat

Water   Marine

12. From the list below, circle **three** natural resources used in the production of food, clothing, and shelter.

Air	Rubies	Mountains
Water	Soil	Uranium

13. Circle the reason ladybugs may be released in a garden or field.

   To feed other insects living on plants

   To protect plants from harmful insects

   To add bright color

   To attract bees

14. Circle the answer that has reduced the manual labor requirement for agriculture.

   Technology   Smaller Farms

   More Workers   Politics

15. Circle **four** agribusinesses in the list below.

Floral Shop	Bakery	Church	Detective Agency
Pet Store	Jewelry Store	Law Firm	Lawn Service

16. Circle the least expensive food.

Apple pie   Fresh apples   Apple juice

17. The government regulates _____. (Circle the correct answer)

Market Price   Farm Size

Pesticide Use   Tractor Size

18. Circle the answer showing a reason nations trade or sell agricultural products and services.

Prevent War   Reduce Commodity Surpluses

Keep Prices Low   Protect the Environment

19. Circle a reason for processing foods.

Decrease Nutrients   Reduce Cost

Improve Taste   Remove Additives

20. Circle the answer that is **not** one of the six basic food nutrients.

   Carbohydrates   Protein   Water

   Fats   Sugar   Vitamins

21. Circle the answer showing how food choices have changed over time.

   More high-fat foods   More processed foods

   Less processed foods   Less convenience foods

22. Which one of the following regulates food handling, preparation, and storage. (Circle the correct answer).

   The Surgeon General   Individual Choice

   State Governor   Government Policy
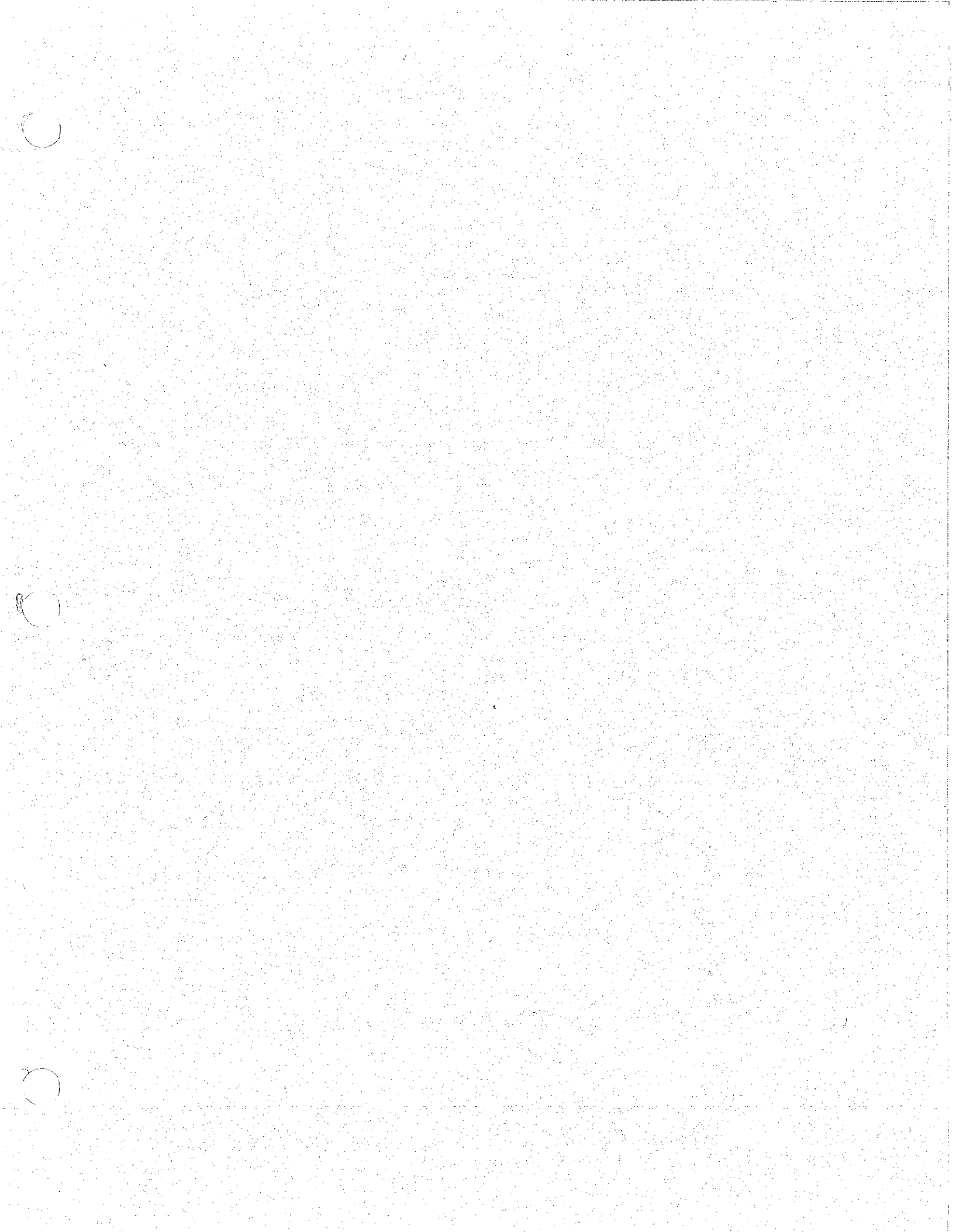
Food and Fiber Systems Literacy Test

for Students in Grades 6-8

Student Instructions: The following pages contain 22 questions about Food and Fiber Systems. Please read each question carefully and select the correct answers or answers. Use a pencil to mark all answers. If you decide to change an answer, carefully and completely erase the incorrect response.

1. Place the agricultural processes in order from 1 (beginning) to 5 (end).

    _____ distribute to stores

    _____ consume the product

    _____ harvest

    _____ determine market

    _____ process raw product

2. Circle **five** food and fiber systems components.

    marketing   religion   distribution   processing

    culture   demographics   regulation   research

3. Circle the country whose citizens spend the smallest percentage of personal income on food.

    Russia   Mexico   Japan

    Brazil   United States   Canada

4. Circle the primary indicator of a nation's economic stability.

    Unemployment rate   military power   food supply   stock market

5. Circle the job category requiring the most years of formal education.

    Professional   Technical   Entry-level

6. Match the innovation with its impact on food and fiber systems.

Innovation	Impact
_____ irrigation	A. less manual labor
_____ engines	B. less insect or disease damage
_____ refrigeration	C. growing crops in dry climates
_____ pesticides	D. keeping foods safe

7. During the Age of Exploration, traders were able to buy goods from other countries due to innovations in _____. (Circle the best answer)

ship building   railroad transportation

farming   record keeping

8. Circle the events or time periods that brought significant agricultural developments or innovations.

U.S. Civil War   1989 San Francisco earthquake

Invention of personal computers   Building of the Berlin Wall

9. Circle the country whose growing season is opposite from the United States.

Canada	Russia	Mexico
England	Australia	Korea

10. Circle the answer that does **not** affect food and fiber production.

The Farm Bill   Federal Housing Authority

Environmental Protection Agency   Foreign Policy Decisions

11. Two factors that determine the plants and animals that grow best in any given region of the world are _____ and _____. (Circle the best answer)

climate and geography   supervisors and workers

food and water   politics and governments

12. _____ play a major role in increasing the quality of animal feeds. (Circle the best answer)

Reptiles   Bacteria   Insects   Amphibians

13. The U.S. _____ helps keep the environment healthy for both agricultural and non-agricultural purposes. (Circle the best answer)

National Environmental Watchdog Group   Environmental Protection Agency

Ecosystem Protective Agency   Environmental Alert Association

14. Match the job skills in the left column to the most appropriate career in the right column.

_____ Chemical Analysis   A. Dairy Production Consultant

_____ Feed Cost Analysis   B. Nursery Manager

_____ Plant Propagation   C. Pesticide Applicator

_____ Vaccinations   D. Veterinarian

15. Circle the skills/knowledge needed to start a lawn maintenance business.

Accounting   Animal Science   Time Management   Small Engine Repair

Surveying   Human Relations   Food Preparation   Leathercraft

16. Match the industry in the left column to the agricultural input in the right column.

_____ Cosmetic industry   A. Pulp trees

_____ Dairy industry   B. Plant and animal wastes

_____ Organic Fertilizer industry   C. Corn

_____ Paper industry   D. Animal by-products

17. Circle a reason the U.S. government regulates food and fiber imports.

Decrease the amount of import taxes

Control the importation of plant and animal pests

Encourage the import of foreign products

Promote the economies of other nations

18. Circle the answer best describing **NAFTA**.

New juice product made from nectarines, apples, figs, tangerines and apricots

North American Firefighter Training Association

Agreement allowing free trade between Canada, the U.S. and Mexico

Agreement that allows trade without import taxes on goods from Nigeria, Argentina, France, Tanzania, and Australia

19. Circle the answer listing the primary ingredient from the food label.

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┌────────────────────────────────────────────┐
│              FOOD LABEL                      │
│ INGREDIENTS:  Roasted Peanuts, Sugar, Partially │
│ Hydrogenated Vegetable Oils (Cottonseed and Corn) │
│ and Salt                                     │
│                                              │
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Vegetable Oils   Sugar   Salt   Roasted Peanuts

20. Determine the total weight of carbohydrates in the container. (Circle the correct answer)

    30   240   7   88

Nutrition Facts	
Serving Size 1 cup (235 g)	
Servings Per Container 4	
Amount Per Serving	
Calories 260 Calories from Fat 70	
% Daily Value	
Total Fat 8g	13%
Saturated Fat 3g	17%
Cholesterol 130mg	44%
Sodium 1010mg	42%
Total Carbohydrate 22g	7%
Dietary Fiber 9g	36%
Sugars 4g	
Protein 25g	
Vitamin A 35%	Vitamin C 2%
Calcium 65	Iron 30%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

21. You have $3.50 to spend on lunch. From the following choices, circle the most economic meal.

Individual prices: nachos – $1.09   burrito - $0.79   taco - $0.59
medium drink - $0.99   water – no charge

Meal #1 for $3.99: 2 burritos, 1 taco, nachos, and a medium drink

Meal #2 for $2.99: 1 burrito, 2 tacos, nachos, and a cup of water

Meal #3 for $3.39: 1 burrito, 1 taco, nachos and a medium drink

Meal #4 for $3.39: Any three items plus a medium drink

22. Circle three sources of contaminants that make food unsafe

Urea   Mold   Condensation

Colostrum   Bone Chips   Bacteria