

## UNIT I - INTRODUCTION TO AGRICULTURE

Lesson 1: Agriculture: What Is It?

**Competency/Objective:** Define agriculture and identify career opportunities in agriculture.

### **Study Questions**

1. **What is agriculture?**
2. **How does agriculture affect your daily life?**
3. **What are the major sectors of the agricultural industry?**
4. **What are examples of agricultural careers in each sector?**

### **References**

1. *Exploring Agriculture in America* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 2000, Unit I.
2. *Think About It* (Brochure). National FFA Center, P.O. Box 68960, 6060 FFA Drive, Indianapolis, IN 46268-0960, 1996.
3. *Agriculture's New Professionals* (Ag Video 105). Missouri Resource Center for Career & Technical Education, University of Missouri-Columbia, 1990.
4. Transparency Masters
  - TM 1.1 Agriculture Is . . . . .
  - TM 1.2 Agriculture Is . . . . . (cont.)
  - TM 1.3 World Population Growth
  - TM 1.4 Average Annual Expenditures for Typical U.S. Family
  - TM 1.5 Disposable Income Spent for Food
  - TM 1.6 Life Expectancy
5. Activity Sheets
  - AS 1.1 Planting Seeds
  - AS 1.2 Change in World Population (Instructor)
  - AS 1.3 Current World Population
  - AS 1.4 Agricultural Career Collage
  - AS 1.5 A to Z Agricultural Careers
  - AS 1.6 Cheeseburger, Fries, and Shake
  - AS 1.7 Name That Career (Instructor)
  - AS 1.8 Agriculture in My Community (Instructor)

## UNIT I - INTRODUCTION TO AGRICULTURE

Lesson 1: Agriculture: What Is It?

### TEACHING PROCEDURES

#### A. **Introduction**

This lesson begins with the evolution of the term agriculture. By completing the activities and assignments, students will develop a more personal view of how agriculture affects them and will identify career opportunities available in the major sectors of agriculture.

#### B. **Motivation**

1. Conduct a word association activity where students list the first thought that comes to mind when the teacher mentions the following words: DNA, food, tractor, baseball, denim, agriculture, greenhouse, newspaper, genetic engineering, zoo, and farming. Have students share their answers.

Next, ask students to analyze the word list presented by the teacher and identify possible relationships. What words have something in common? For example, food, denim, and baseball represent processed agricultural products produced on a farm. This activity could also be accomplished in groups through a concept (web) map or by brainstorming.

Very few students will associate agriculture with many of the words. Conclude the activity by explaining that all the words are related to agriculture and this will become evident during this course.

2. To obtain a baseline on student knowledge and perceptions on agriculture, place one of the following items on a table where groups of three to four students can gather: baseball, newspaper or agricultural magazine, golf tee (traditional wood), soybean processed material used in construction, golf tee (made from biodegradable corn starch), house plant, candy made from agricultural products (such as Super Soynuts).

Each group should discuss several questions: (a) What is your item made of? (b) Is there a connection between your item and agriculture?

3. To prepare for the next unit, conduct AS 1.1. Ask students what is going to happen with the seeds they have planted. The students should check on their seeds each day to watch for growth and to care for them. Select fast-growing vegetables, such as radishes, that can be raised and consumed by students. Also plant corn and soybeans so that parts might be used in Unit II, Lesson 2.

#### C. **Assignment**

#### D. **Supervised Study**

#### E. **Discussion**

##### **Q1. What is agriculture?**

- A1. All aspects of the global food, fiber, and natural resources systems, including the development, production, processing, marketing, and distribution of food and fiber products; the health and nutrition of food consumption; the use, conservation, and maintenance of environmental, and recreational resources; and the related**

**scientific, economic, sociological, political, and cultural characteristics of the food, fiber, and natural resources systems.**

Using TMs 1.1 and 1.2, ask students to define agriculture. Next, ask students to identify key words in the definition. Conduct AS 1.2 to have students graph how world population has increased, then show TM 1.3 to provide the answer. Have students complete AS 1.3 to get an idea of how much the population increases minute-by-minute.

**Q2. How does agriculture affect your daily life?**

**A2.**

- a) **Agriculture is the largest industry in the United States, providing approximately 20% of the jobs. The agricultural industry employs over 22 million people.**
- b) **Americans enjoy low food costs compared to all the items they buy.**
- c) **Americans spend approximately 11% of their disposable income on food, which is less than people in other countries.**
- d) **Agricultural research and a healthy food supply have contributed to a much longer life expectancy.**
- e) **Millions of dollars of taxes generated by agriculture support the local, state, and national governments. Many rural school districts receive a major portion of their funding from agricultural property taxes.**

Engage students in discussion by asking them to guess the cost of food for an average family of 2.5 people and the life expectancy for various countries in the world. Use TMs 1.4, 1.5, and 1.6 to summarize this area.

**Q3. What are the major sectors of the agricultural industry?**

**A3. There are many different ways to categorize the major sectors of agriculture; however, a common and accepted classification system is as follows:**

- a) **Agricultural systems technology**
- b) **Agricultural processing and marketing**
- c) **Agricultural supplies and services**
- d) **Forestry**
- e) **Horticulture**
- f) **Production agriculture**
- g) **Natural resources**

Show the video *Agriculture's New Professionals* as an overview of the major sectors of the agricultural careers in the United States. Student groups or individual students can complete AS 1.4 to create an agricultural career collage. Old agricultural magazines with photos could help the students.

**Q4. What are examples of agricultural careers in each sector?**

**A4. There are many answers for this question from the brochure *Think About It*. Several careers for each of the major sectors are listed below:**

- a) **Agricultural systems technology**
  - 1) **Engine technician**
  - 2) **Agricultural electrician**
  - 3) **Agricultural engineer**
- b) **Agricultural processing and marketing**
  - 1) **Meat department manager**

- 2) Food scientist
- 3) Grain elevator manager
- 4) Citrus processor
- c) **Agricultural supplies and services**
  - 1) Agricultural journalist
  - 2) Genetic engineer
  - 3) Agricultural loan officer (banker)
  - 4) Veterinarian
- d) **Forestry**
  - 1) Park ranger
  - 2) Forester
  - 3) Timber manager
- e) **Horticulture**
  - 1) Floral designer
  - 2) Turf grass specialist
  - 3) Landscape architect
- f) **Production agriculture**
  - 1) Beekeeper
  - 2) Livestock herdsman
  - 3) Grain producer
- g) **Natural resources**
  - 1) Soil conservationist
  - 2) Fish and wildlife specialist
  - 3) Water quality specialist

Assign students AS 1.5 to complete and bring to the next class period. Most students will name production careers such as A - Apple grower, B - Berry grower, etc. Provide students with the brochure *Think About It* and conduct AS 1.4 again but this time challenge students to identify agricultural careers that may interest them but are not in the production agriculture sector. Students should identify in which sector of agriculture each career would be found. Finally, have students complete AS 1.6, AS 1.7, and AS 1.8 to expand their knowledge of careers and agriculture-related businesses.

#### F. **Other Activities**

1. Access the Agricultural Career Center web site to research agricultural careers.  
<<http://www.ffa.org/careers/index.html>>
2. Order agricultural career posters ("Living Science" Poster Set, available for \$4 from Office of the Dean, Purdue University, School of Agriculture, Administration Building, West Lafayette, IN 47907-1140)

#### G. **Conclusion**

Agriculture is more than farming. The definition of agriculture has evolved to include career areas in seven major sectors of the agricultural industry. The global aspect of agriculture is concerned with the increasing world population. The country's largest employer is agriculture. Several major benefits are provided by agriculture including a low food cost compared to other countries and helping to increase the life expectancy of humans. Agriculture benefits everyone each and every day.

#### H. **Answers to Activity Sheets**

Answers to all activity sheets will vary.

I. ***Evaluation***

A unit test is provided at the end of this unit. If a lesson quiz is needed, use questions pertaining to this lesson from the unit test.



## **Agriculture is . . . . .**

**All aspects of the global food, fiber, and natural resources systems, including**

- **the development, production, processing, marketing, and distribution of food and fiber products;**
- **the health and nutrition of food consumption;**



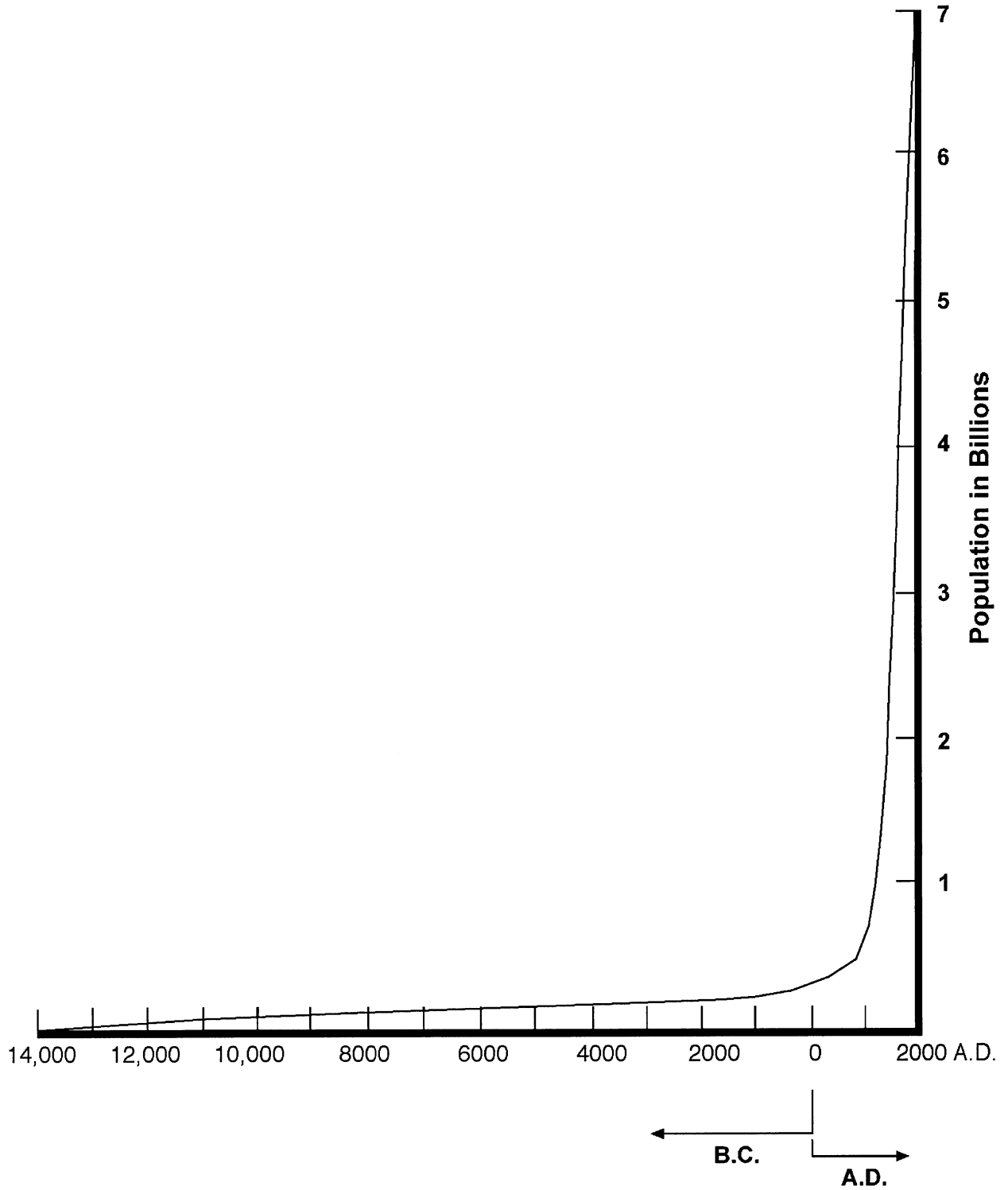


## **Agriculture is . . . . . (cont.)**

- **the use, conservation, and maintenance of environmental and recreational resources;**
- **and the related scientific, economic, sociological, political, and cultural characteristics of the food, fiber, and natural resources systems.**

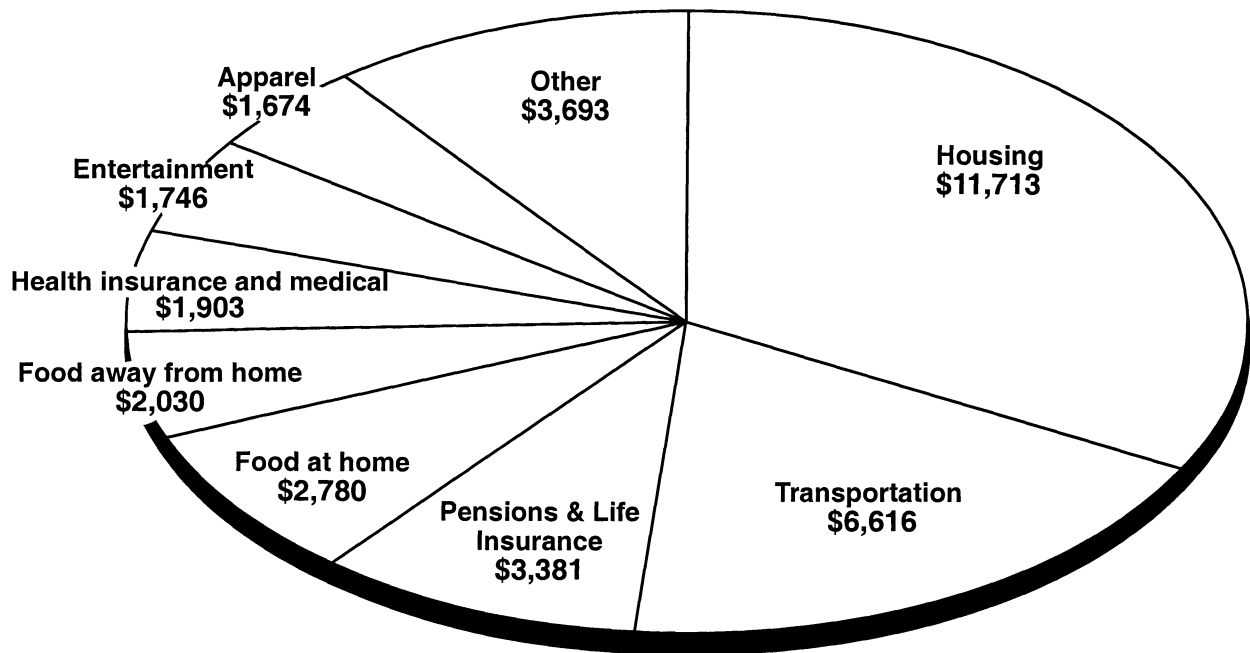


# World Population Growth





# Average Annual Expenditures for Typical U.S. Family

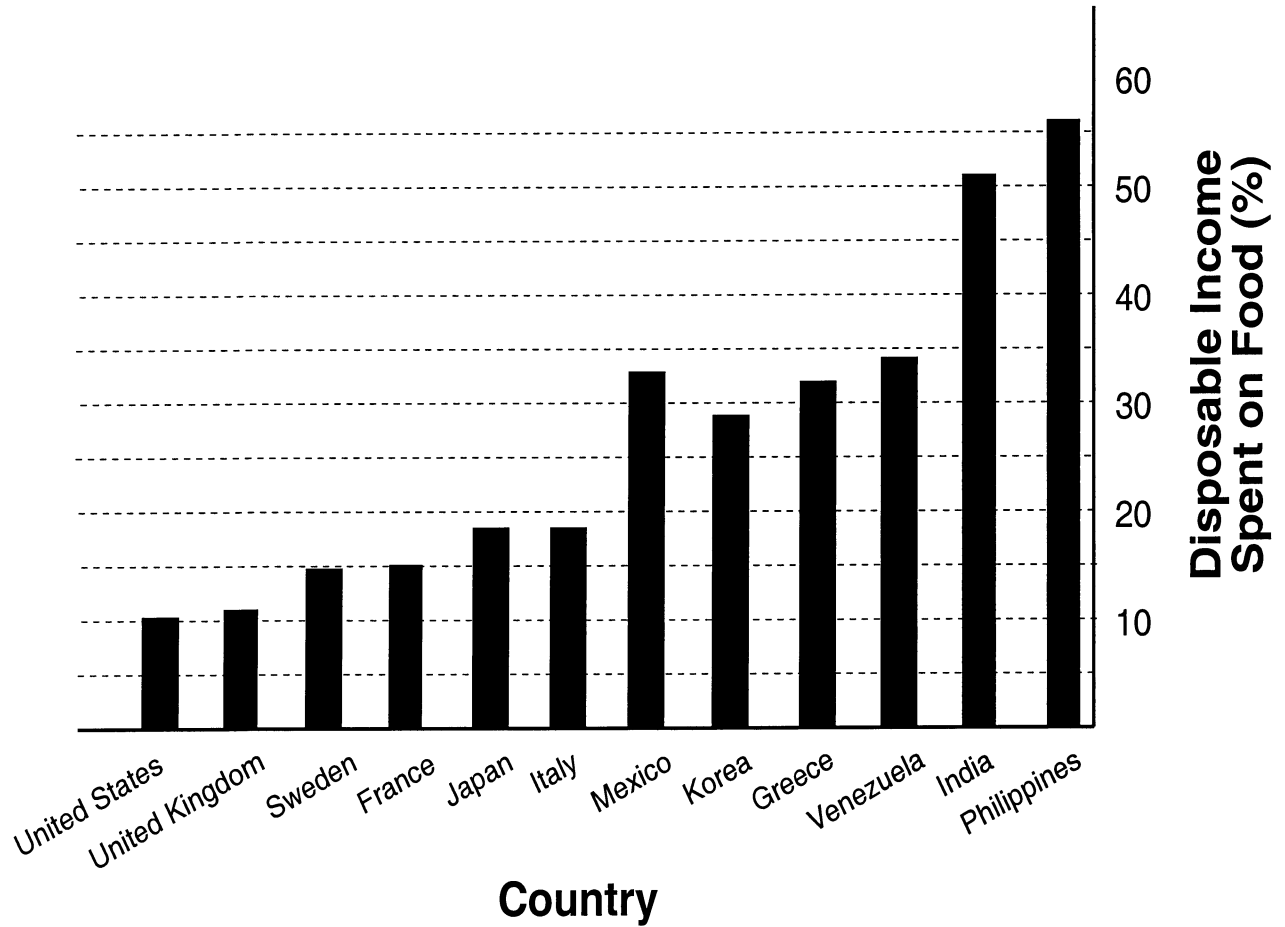


Total Expenditures = \$35,536

Source: U.S. Department of Labor - Bureau of Labor Statistics (1998)  
Average Number in Family: 2.5  
Average Number of Earners: 1.3



# Disposable Income Spent for Food

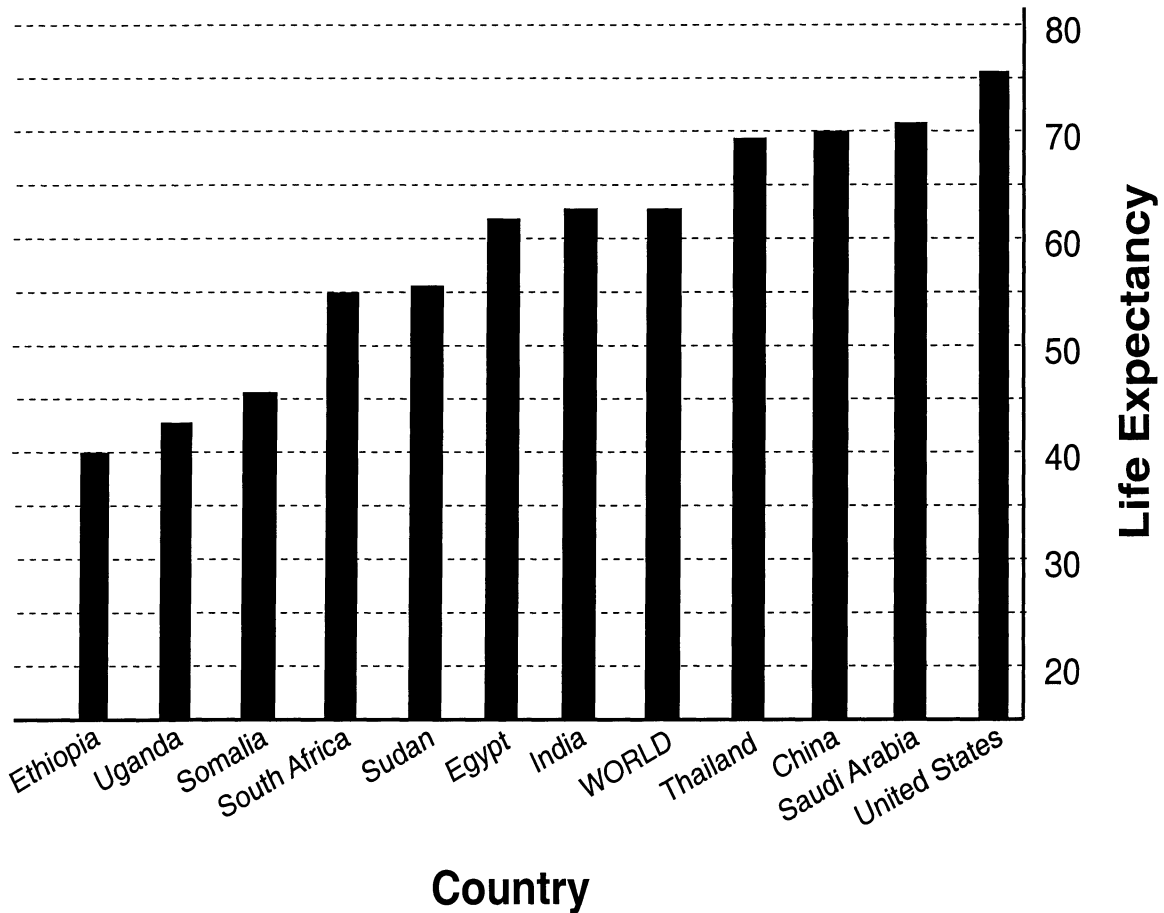


Source: U.S. Department of Agriculture (1996)





# Life Expectancy



Source: Central Intelligence Agency - *The World Fact Book* (1999)



Lesson 1: Agriculture: What Is It?

Name \_\_\_\_\_

### **Planting Seeds**

**Objective:** Students will be able to demonstrate how to plant seeds.

**Materials and Equipment:**

1 container – flowerpot, cup, etc.  
Potting soil  
Seeds - to be provided by instructor  
Water

**Procedure:**

1. First watch the instructor demonstrate how to plant seeds. You will follow these directions.
2. If you are using a cup instead of a flowerpot, place a hole in the bottom so the water can drain out.
3. Fill the pot with soil up to 1/2 inch from the top.
4. Use your finger to make a small hole in the soil.
5. Place the seed in the hole and cover lightly with the soil.
6. Water thoroughly.
7. Place the pot in a well-lighted area, such as by a window.
8. Examine your plant every day and water it when it is dry.



**Change in World Population**

**Objective:** Students will develop an understanding of the increasing world population.

**Directions:** Use the chalkboard or white board to construct a graph of world population. The vertical axis represents billions of people in the world and the horizontal axis represents years, starting from the beginning of recorded time to the present. To show the concept of increasing world population, it is important to use an accurate scale to represent time. In addition, the starting point of recorded history will challenge students to remember social studies issues and they may want to talk to a social studies teacher about this concept.

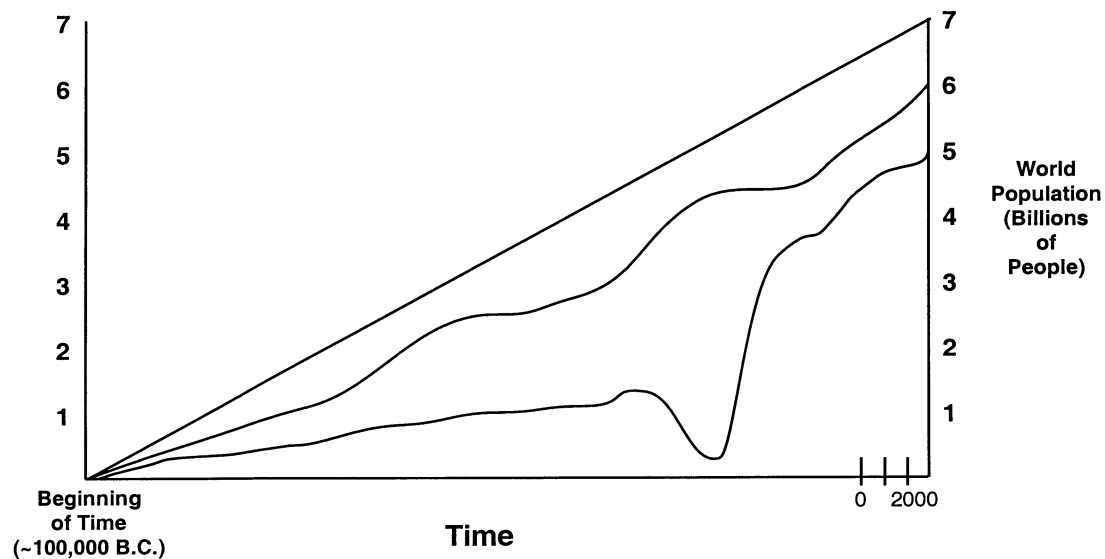
Provide students with the data below or have students do research. An excellent source to use is the U.S. Census Bureau, which can be accessed on the Internet at <<http://www.census.gov/ipc/www/world.html>>. Ask for student volunteers to draw what they think has been the change in population over time. After students have drawn the graph, show TM 1.3 to summarize the concept of increasing world population.

**Teacher-Provided World Population Data**

Following are the approximate world populations for the indicated years.

Year	Population in Billions
1825	1.0
1925	2.0
1960	3.0
1975	4.0
1987	5.0
1999	6.0

The following graph shows typical student responses.



As an additional assignment, students could predict the future world population by using a math skill called extrapolation. Students can research this topic as well on the U.S. Census Bureau web site.



**Current World Population**

**Objective:** Students will develop an understanding of how the increasing world population relates to agriculture.

**Directions:** Use the U.S. Census Bureau World Population Information on the Internet <<http://www.census.gov/ipc/www/world.html>> to answer the following questions.

After going to the above address, click on the **World POPClock** link, find the dynamic **World POPCLOCK**, and gather up-to-the-minute world population data. You will record the population every minute for 10 minutes. In the table below, record the time, population, and change in population during the last minute. Record the data, wait 1 minute, and then press the reload button to get the new data. Continue to press the reload button every minute.

Minutes	Actual Time Listed at the Web Site	World Population	Population Change During the Last Minute
Start			N/A
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
<b>Total Increase in World Population During Previous 10 Minutes</b> (Add values in the 4 <sup>th</sup> column)			

**Key Questions:**

- Does the population change the same amount during each of the 10 minutes?
- Assuming a constant rate, how much would you expect the world population to increase in 1 day (total increase in world population during previous 10 minutes x 6 x 24)?

3. How much would you expect the population to increase in 1 year (365 days), assuming a constant rate?
  
4. If you assume that the population of the world increases at the same rate, what will the population be in 20 years?
  
5. List some variables that could cause your 20-year prediction to be inaccurate.
  
6. Why do you think the ability to predict the world's population is important?



Lesson 1: Agriculture: What Is It?

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**Agricultural Career Collage****Objective:** Students will develop an understanding for the various career sectors in agriculture.**Directions:** Select one of the following sectors of the agricultural industry and develop a collage that represents that sector.

The agricultural industry consists of seven sectors:

1. Agricultural systems technology
2. Agricultural processing and marketing
3. Agricultural supplies and services
4. Forestry
5. Horticulture
6. Production agriculture
7. Natural resources

You will be evaluated according to the following scoring guide.

Item	Points Possible	Your Score
<b>Representative:</b> Collage represents the sector.	5	
<b>Diversity:</b> Various careers, businesses, and geographic areas are represented.	5	
<b>Colorful:</b> Color pictures are more appealing than black and white.	5	
<b>Creativity:</b> Special effects such as poster shape, words, 3-D, etc., are used rather than a basic rectangular design.	5	
<b>Total</b>	20	

Comments:



**A to Z Agricultural Careers**

**Objective:** Students will identify career opportunities available in agriculture.

**Directions:** Identify agricultural careers by each letter of the alphabet.

A \_\_\_\_\_

B \_\_\_\_\_

C \_\_\_\_\_

D \_\_\_\_\_

E \_\_\_\_\_

F \_\_\_\_\_

G \_\_\_\_\_

H \_\_\_\_\_

I \_\_\_\_\_

J \_\_\_\_\_

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Y \_\_\_\_\_

Z \_\_\_\_\_



Lesson 1: Agriculture: What Is It?

Name \_\_\_\_\_

**Cheeseburger, Fries, and Shake**

**Objective:** Students will identify how careers in agriculture affect their everyday life.

**Directions:** Identify all of the careers associated with cheeseburger, fries, and shake. Place each of the agricultural careers into one of the seven sectors of agriculture. How many are agricultural or related to agriculture? \_\_\_\_\_

1. Agricultural systems technology
  
2. Agricultural processing and marketing
  
3. Agricultural supplies and services
  
4. Forestry
  
5. Horticulture
  
6. Production agriculture
  
7. Natural resources



**Name That Career**

**Objective:** Students will identify careers based on descriptions.

**Directions:** This is an activity that can be conducted during this unit or at other times.

1. Each student first researches an agricultural career of his/her choice and writes information about the following key points:
  - a. Job description
  - b. Skills needed
  - c. Work environment
  - d. Work alone or with others
  - e. Equipment, tools, or machinery used
2. Collect the career reports.
3. Form teams of three to five students, depending on the class size.
4. Randomly hand out one career report to each team and instruct each team not to tell the other team(s) what career they have.
5. Instruct students in each team to briefly study their career so they can answer questions about it.
6. One member of the first team selects a person on the second team and asks a "yes" or "no" question about the career. The objective is to identify the career with the least number of questions.
7. Set the number of questions each team member can ask. Usually two or three works well.
8. Give each team a point for each question asked. The lowest score wins.





### **Agriculture in My Community**

**Objective:** Students will identify businesses in their community that are agriculture-related.

**Materials:**

Local phone directories (one for each student)  
Poster paper

**Directions:**

1. Divide students into groups of three and assign each group a portion of the alphabet. For example, five groups would receive the following assignments: A-E, F-J, K-O, P-T, U-Z.
2. Using the phone books, have students list on poster paper the businesses that are related to agriculture. Challenge groups to see how many businesses they can list and justify as related to agriculture.
3. Have students categorize each business as one of the seven major sectors of agriculture.
4. Finally, students should identify one business in each of the seven major sectors that best represents that career area of agriculture.



## UNIT I - INTRODUCTION TO AGRICULTURE

### Lesson 2: Agriculture in the World

**Competency/Objective:** Describe the role of agriculture in the world.

#### **Study Questions**

1. **Why is agriculture important in the world?**
2. **How and why does agriculture vary throughout the world?**
3. **What commodities are produced in the major world regions?**
4. **What is the role of U.S. agriculture in the world market?**

#### **References**

1. *Exploring Agriculture in America* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 2000, Unit I.
2. Global Vision instructional material and video. National FFA Organization, P.O. Box 68960, Indianapolis, IN 46268-0960, free.
3. Transparency Masters  
TM 2.1 Food Deficit Countries  
TM 2.2 World Map  
TM 2.3 Agricultural Commodities in Major World Regions  
TM 2.4 World Statistics for Food, Population, and Life Expectancy  
TM 2.5 United States Exports Purchased
4. Activity Sheets  
AS 2.1 International Auction (Instructor)  
AS 2.1 International Auction (Student)  
AS 2.2 Travel to a Foreign Country on the Internet  
AS 2.3 World Food Activity (Instructor)

## UNIT I - INTRODUCTION TO AGRICULTURE

### Lesson 2: Agriculture in the World

#### TEACHING PROCEDURES

##### A. **Review**

In the previous lesson we discussed how the definition of agriculture has evolved to encompass all aspects of the global food, fiber, and natural resources systems. This lesson examines the role of agriculture in the world – its importance, why it varies, and where agricultural commodities are produced.

##### B. **Motivation**

1. Put agricultural items that are imported to the United States on tables and have students sample them for taste. Some product examples and the major countries where they are grown are as follows: bananas (Costa Rica, Ecuador), cashews (Brazil, India), coffee (Columbia, Brazil, Mexico), olives (Spain, Morocco, Greece), and peppers (Mexico). Have students guess where the items are grown. Summarize that all of the items have a connection in that they are examples of agricultural products grown in the world that are imported to the United States.
2. Talk about a world issue, make announcements, etc., for one minute and then ask students to estimate how many people were born in the world during that time span. In 1999, the number was 250. What does this mean for agriculture? Can we produce enough food for these people? Put this number in terms of students in a class, school, city, etc., so the issue becomes relevant. For example, in the past minute, a school our size was born in the world.

World figures for 1999 available through the U.S. Census Bureau are as follows (figures may not add to totals due to rounding).

<b>Time Unit</b>	<b>Births</b>	<b>Deaths</b>	<b>Natural Increase</b>
Second	4.2	1.7	2.5
Minute	250	103	147
Hour	15,008	6,181	8,827
Day	360,187	148,348	211,839
Month	10,955,686	4,512,252	6,443,434
Year	131,468,233	54,147,021	77,321,212

3. Conduct AS 2.1. The Instructor version explains how to conduct the international auction.

##### C. **Assignment**

##### D. **Supervised Study**

##### E. **Discussion**

#### **Q1. Why is agriculture important in the world?**

##### **A1.**

- a) **Provides food, clothing, and shelter**
- b) **Provides income for other purchases**

**c) Provides medicines and pharmaceuticals**

The survival of many countries is dependent upon the products of other countries. Agricultural producers play an important role in the world economy. Use TM 2.1 to identify the countries that do not produce enough food to feed themselves. Engage the class in a discussion of what they observe on this map emphasizing that the countries shaded in black have much less food available to them. Ask students what they think it would be like to live in one of those countries. Some countries export agricultural products to get money needed to buy products they are not able to produce. Show the Global Vision video. It has two 12-minute segments.

**Q2. How and why does agriculture vary throughout the world?**

**A2.**

- a) Climate**
- b) Soil fertility, drainage, and topography**
- c) Economic development**
- d) Technology**
- e) Marketing and distribution system**

Conduct AS 2.2 by assigning each student a country to research. Select countries from each of the continents so there is representation throughout the world. This will also be helpful during AS 2.3. Go to the computer lab and access the Internet. When students report on their country, it will be very evident how and why agriculture varies in the world.

**Q3. What commodities are produced in the major world regions?**

**A3.**

- a) Africa - cotton, metals, and petroleum products**
- b) Asia - rice and tea**
- c) Australia - wheat, sheep, and wool**
- d) Europe - floriculture, potatoes, cereal grains, and textiles**
- e) North America - corn, soybeans, beef, pork, and wood products**
- f) South America - coffee, soybeans, metals, and wood products**

Show TM 2.2 and ask students where and what commodities are produced in the world. Show TM 2.3 to summarize the answers.

**Q4. What is the role of U.S. agriculture in the world market?**

**A4.**

- a) Supplies the food needed to feed its citizens**
- b) Exports food and other products needed by other countries**
- c) Provides technical and educational assistance**
- d) Administers foreign food assistance programs**

The United States has sufficient resources to produce nearly all of the food needed to feed its population. Agriculture in the United States also provides support for many developing nations. Other countries are less fortunate and buy food produced in the United States to feed their people. Agricultural exports are vitally important to the United States' economy and totaled \$61.8 billion in 1998. Discuss TMs 2.4 and TM 2.5 as an introduction to conducting AS 2.3.

**F. *Other Activities***

G. ***Conclusion***

Agricultural products play an important role in the world economy. Agriculture varies from country to country primarily due to climate and technology. Imports supply countries with agricultural products that cannot be produced in that country. The United States continues to play a key role in providing assistance to countries that cannot produce the food and other products needed for their citizens. Such programs involve providing technical and educational assistance to developing countries.

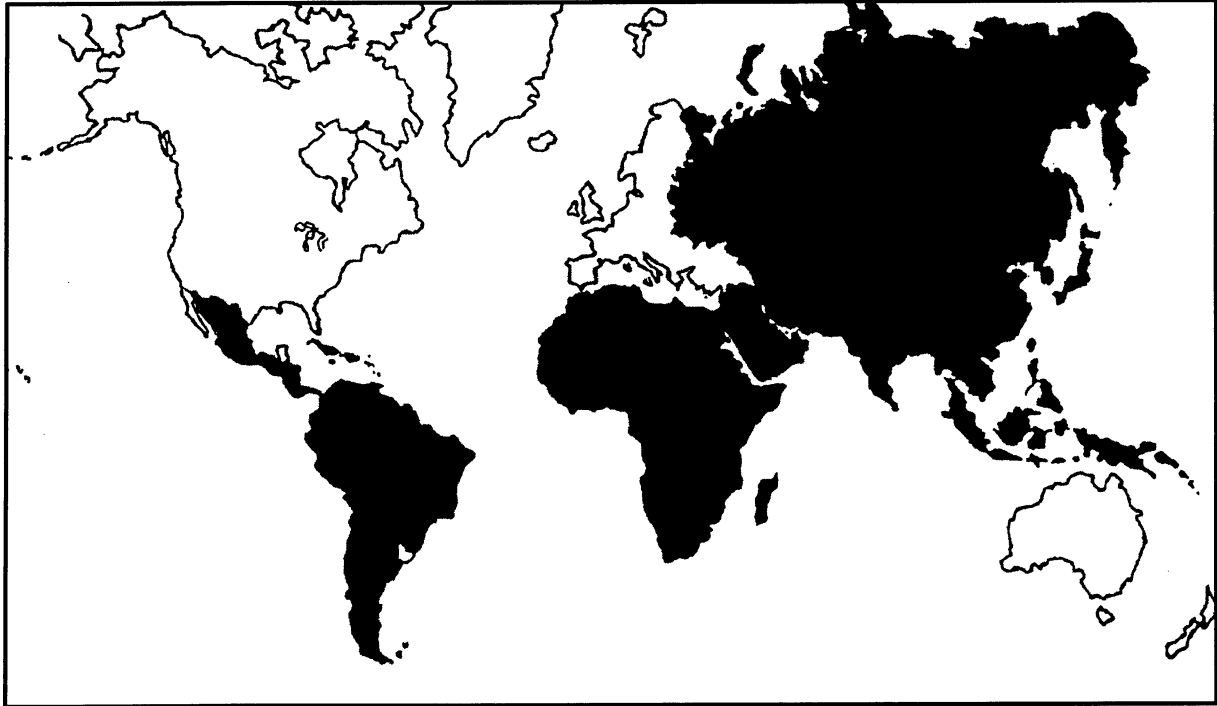
H. ***Answers to Activity Sheets***

Answers to all activity sheets will vary.

I. ***Evaluation***

A unit test is provided at the end of this unit. If a lesson quiz is needed, use questions pertaining to this lesson from the unit test.

# Food Deficit Regions



 Indicates Regions with Deficits



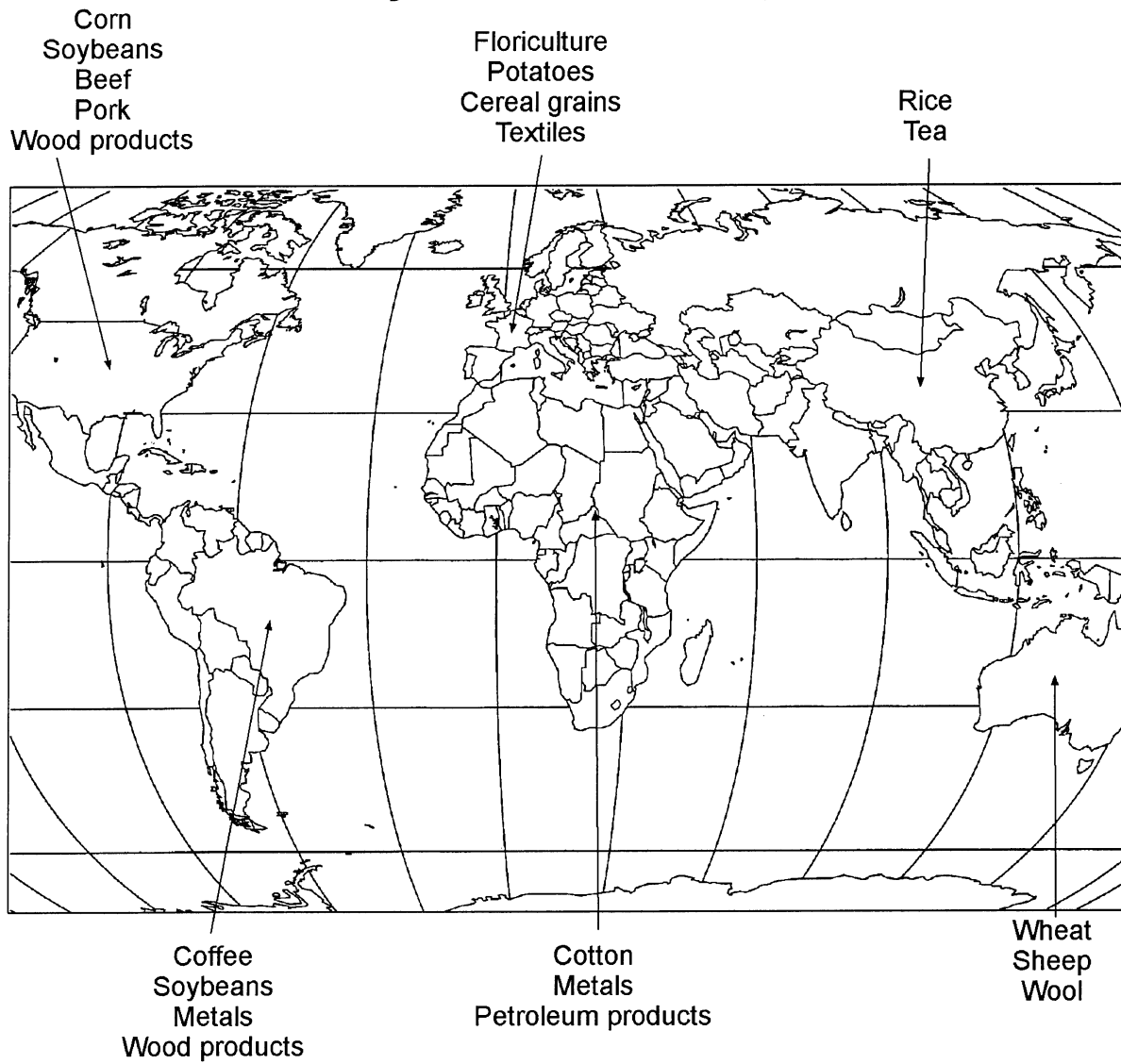


# World Map





# Agricultural Commodities in Major World Regions





## World Statistics for Food, Population, and Life Expectancy

<b>Continent</b>	<b>World Food Consumed (%)</b>	<b>World Population (%)</b>	<b>Life Expectancy</b>
Africa	8	13	54
Asia	23	61	64
Europe	36	12	74
North America	22	8	74
South America	11	6	67

**Source:** *World Population Prospects*, United Nations Population Division (1999)



## U.S. Exports Purchased

<b>Country</b>	<b>Amount of U.S. Agricultural Exports Purchased (in Billions of Dollars)</b>	<b>Percent of U.S. Agricultural Exports</b>
Japan	\$12.1	19.6%
European Union (15 countries)	\$10.0	16.3%
Canada	\$9.0	14.6%
Mexico	\$6.3	10.2%
South Korea	\$2.4	3.9%





**International Auction**

**Objective:** Students will gain a better understanding of how funds available to purchase agricultural products on the world market affect food distribution.

**Directions:** Before class begins, copy five pages of "food product" coupons and five pages of "other product" coupons (provided on the next two pages). Cut out the coupons.

Divide the class into groups of three or four students. Assign each group to represent a country from the list provided below. Provide each group with the amount of money indicated, which is the amount of money available to buy agricultural products on the world market. Tell each group how much money it has available and how many food coupons it needs to purchase to feed the country's population. Distribute a copy of AS 2.1 (Student) to each group (country) to record its purchases.

Each group should purchase the food first; additional products may be purchased if the amount of food is adequate. Have each group report its position after all trading has been completed.

<u>Country</u>	<u>Units of Food Needed</u>	<u>Funds Available</u>
USA	1	\$50 billion
England	1	\$10 billion
France	1	\$10 billion
Australia	1	\$10 billion
USSR	5	\$20 billion
China	10	\$10 billion
India	15	\$10 billion
Japan	5	\$30 billion
Ethiopia	10	\$5 billion
Saudi Arabia	5	\$40 billion

Conduct an auction, beginning with the food product coupons until each group (country) has spent all of its money or does not wish to make any more purchases. At the end of the auction, have each group explain what was purchased and how much money is left over.

Students should be guided to the conclusion that some countries lack sufficient resources to raise or purchase the food needed to feed their people. Other countries are wealthy enough to supply the food and also to purchase other products to improve the quality of life for their citizens. Also, note that countries with a large amount of funds available usually get those funds by exporting other products. Countries with limited funds usually have fewer products that they can sell as exports.







OTHER PRODUCT COUPONS

Automobiles \$2 Billion	Crude Oil \$2 Billion
Electronic Equipment \$3 Billion	Military Aircraft \$3 Billion
Medicine \$1 Billion	Tractors \$1 Billion
Lumber \$1 Billion	Steel \$1 Billion
Airplanes \$3 Billion	Agricultural Equipment \$1 Billion
Shoes \$1 Billion	Clothing \$1 Billion



**International Auction**

**Objective:** Students will gain a better understanding of how funds available to purchase agricultural products on the world market affect food distribution.

**Directions:** Fill in the blanks as indicated. As purchases are made, record what was purchased and how much was spent on each purchase.

Country \_\_\_\_\_

Food Units Needed \_\_\_\_\_

Funds Available \$ \_\_\_\_\_

Units Purchased	Funds Spent
Ending Balance: \$	

Were you able to purchase enough food to feed your country? Why or why not?





Lesson 2: Agriculture in the World

Name \_\_\_\_\_

**Travel to a Foreign Country on the Internet**

**Objective:** Students will identify key information about foreign countries.

**Directions:** Use the *1999 World Fact Book* (<<http://www.odci.gov/cia/publications/factbook/index.html>> and then click on the Country Listing link to find the following key information about your country.

\_\_\_\_\_ Country

<b>Location</b>	
<b>Area</b> (comparative)	
<b>Land Use</b>	
<b>Environment</b> (current issues)	

<b>Age Structure</b> 0-14 years 15-64 years 65 years and over	
<b>Literacy</b> definition total population	
<b>Population Growth Rate</b>	
<b>Life Expectancy At Birth</b> total population male female	
<b>Languages</b> (official)	
<b>Population Below Poverty Line</b>	
<b>Unemployment Rate</b>	
<b>Agriculture</b> (products)	

### World Food Activity

**Objective:** Students will be able to understand the relationship between people and food in the global setting.

**Materials and Equipment:**

Food items such as donuts, bread sticks, candy, etc., work the best for this activity. The quantity and the exact food item will depend on the size of the class and the time of day the class meets. Cutting utensils, plates, and napkins may also be needed, depending on the food items selected.

**Procedure:**

Note: An example is provided on the next page to help understand these procedures.

1. Put food item on a table at the front of the room and explain that the food represents all the food that will be consumed in the world today.
2. Write each continent name on a piece of cardboard, and then fold into a tent shape. Place these names at tables so students know which continent each group of students represents.
3. Based on the percent of world population in each continent (found in the example), and the number of students in the class, make slips of paper to represent this distribution. For example, Africa has 13% of the world population. In a class of 20 students, 13% or approximately 3 students ( $.13 \times 20$ ) would represent Africa.
4. In addition, indicate poor country, rich country, or country with political power on the slips of paper (see example). Not all counties located on their respective continents are equal, so this aspect adds some realism. This information will help students role-play the financial and political status of the country they represent.
5. Have each student randomly draw the continent/country that he/she will represent. After this random selection, students will gather by continent around a table(s) or section of the room.
6. Before each continent is given its amount of food (see example), each group must develop a plan for distribution to each country. Students must discuss and form a consensus as to how their food will be consumed. If the students can't come to a consensus, the instructor will make the decision.
7. Ask each continent to explain its food distribution plan. Finally, have a representative come forward to obtain that continent's food supply. How do students who did not get as much food to eat feel? Continents may offer to trade items for another continent's excess food. Do students think there is a connection between life expectancy and food?
8. Will students give the same portion to everyone? Or will they give larger portions to the ones who have more monetary or political power? Will the poor countries receive any food at all?
9. Continents with a low food supply or those with excess food may wish to discuss importing or exporting. Encourage this discussion and after each continent receives its food, discussion will become more serious. Will an "international conflict" take place?

**Example:** Using 10 donuts for a class of 20 would result in the following donut distribution:

<b>Continent</b>	<b>Donut</b>	<b>% Food</b>	<b>% Population</b>	<b>Life Expectancy</b>
Africa	1	8	13	54
Asia	2 ¼	23	61	64
Europe	3 ½	36	12	74
North America	2 ¼	22	8	74
South America	1	11	6	67

These continent/country indicator names are in the correct proportion based on world population and a class of 20 (use these for the slips of paper for the drawing):

Africa (rich country)

Asia (poor country)

Africa (poor country)

Asia (poor country)

Africa (poor country)

Asia (poor country)

Asia (country with political power)

Asia (poor country)

Asia (rich country)

Asia (poor country)

Asia (rich country)

Europe (rich country)

Asia (rich country)

Europe (poor country)

Asia (poor country)

North America (rich country)

Asia (poor country)

North America (poor country)

Asia (poor country)

South America

## UNIT I - INTRODUCTION TO AGRICULTURE

### Lesson 3: Agriculture in the United States

**Competency/Objective:** Describe the role of agriculture in the United States.

#### **Study Questions**

1. **Where are major products produced in the United States?**
2. **What enables agriculture to be successful in the United States?**
3. **What are the goals of agriculture in the United States?**
4. **How has the U.S. agricultural industry evolved?**
5. **How have changes in agriculture impacted U.S. history?**

#### **References**

1. *Exploring Agriculture in America* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 2000, Unit I.
2. Transparency Master  
TM 3.1 Map of United States
3. Activity Sheets  
AS 3.1 Census of Agriculture (Instructor)  
AS 3.1 Census of Agriculture (Student)  
AS 3.1 Census of Agriculture (Supplement)  
AS 3.2 Time Line of Agriculture and History (Instructor)

UNIT I - INTRODUCTION TO AGRICULTURE

Lesson 3: Agriculture in the United States

TEACHING PROCEDURES

A. **Review**

Previously we learned the importance of agriculture in the world. This lesson examines the role of the agricultural industry in the United States. Discussion about our country's largest employer will focus on the evolution of agriculture, how it has impacted U.S. history, and important characteristics of agriculture.

B. **Motivation**

1. Ask students to guess how much of the following food items each person (per capita) consumes each year. These 1996 figures are available from the USDA web site at <<http://www.nass.usda.gov/pa/annsum98/page88.htm>>.

<b>Food Item</b>	<b>Per Capita Consumption</b>
Beef	64 lb.
Pork	46 lb.
Chicken	50 lb.
Fish	15 lb.
Potatoes	145 lb.
Fruit	228 lb.
Vegetables	253 lb.
Ice cream	16 lb.
Milk	24 gal.
Coffee	22 gal.
Carbonated soft drinks	52 gal.
Bottled water	14 gal.

2. Conduct a word association activity where students list the first thought that comes to mind regarding agriculture when the teacher announces the following states: Texas, Idaho, California, Iowa, Georgia, Kansas, Minnesota, Washington, Florida, Wisconsin, North Carolina. This motivational activity will help the teacher assess the basic knowledge level students have about agriculture in the United States.

C. **Assignment**

D. **Supervised Study**

E. **Discussion**

**Q1. Where are major products produced in the United States?**

**A1. Based on the 1997 Census of Agriculture:**

<b>Agricultural Product</b>	<b>Leading States</b>
Beef cows	Texas, Missouri, Nebraska, Oklahoma, South Dakota
Market beef	Texas, Kansas, Nebraska, Colorado, Iowa
Dairy cows/products	California, Wisconsin, New York, Pennsylvania, Minnesota
Market pigs	Iowa, North Carolina, Minnesota, Illinois, Indiana
Sheep and lambs	Colorado, Texas, Wyoming, California, South Dakota
Egg production (layers)	California, Ohio, Pennsylvania, Iowa, Indiana
Chickens (broilers)	Georgia, Arkansas, Alabama, North Carolina, Mississippi
Turkeys sold	North Carolina, Minnesota, Virginia, Arkansas, California
Corn	Iowa, Illinois, Nebraska, Minnesota, Indiana
Wheat	Kansas, North Dakota, Montana, Washington, Oklahoma
Soybeans	Iowa, Illinois, Minnesota, Indiana, Ohio
Cotton	Texas, California, Georgia, Mississippi, Arkansas
Peanuts	Georgia, Texas, Alabama, North Carolina, Florida
Potatoes	Idaho, Washington, Wisconsin, Oregon, Colorado
Alfalfa hay	California, Wisconsin, South Dakota, Nebraska, Idaho
Green peas	Minnesota, Wisconsin, Washington, Oregon, New York
Lettuce	California, Arizona, Florida, New Jersey, Colorado
Sweet corn	Minnesota, Wisconsin, Washington, New York, Oregon
Tomatoes	California, Florida, Ohio, Michigan, Indiana
Apples	Washington, Michigan, New York, California, Pennsylvania
Oranges	Florida, California, Texas, Arizona, Hawaii
Grapefruit	Florida, California, Texas, Arizona, Hawaii
Pears	Washington, California, Oregon, New York, Michigan
Peaches	California, Georgia, South Carolina, New Jersey, Michigan
Pecans	Georgia, Texas, New Mexico, Arizona, Oklahoma
Strawberries	California, Florida, Oregon, Washington, Michigan

Have students complete AS 3.1 to answer this study question. Use more current data if available. Using the answers for AS 3.1 and the U.S. map on TM 3.1, locate the states that grow the major commodities.

**Q2. What enables agriculture to be successful in the United States?**

**A2.**

- a) **Fertile soil - some of the finest in the world**
- b) **Growing conditions - very favorable for producing a variety of crops**
- c) **New technology and many discoveries by leaders, inventors, researchers, and scientists**
- d) **Technology adopted by entrepreneurs to improve production and efficiency**
- e) **Advanced and extensive transportation and marketing system**

Discuss with students the successful characteristics of a business. Relate those factors to agriculture.

**Q3. What are the goals of agriculture in the United States?**

A3.

- a) **Provide food, clothing, and shelter**
- b) **Protect the environment**
- c) **Ensure food safety**
- d) **Use technology to benefit consumers**

Have students provide examples of how agriculture fulfills each of the four goals. Identify how the goals of agriculture have changed over time.

**Q4. How has the U.S. agricultural industry evolved?**

A4.

- a) **The United States has shifted from a nation of farmers at the time of the Revolutionary War (90% of the colonists were farmers) to an agribusiness economy.**
- b) **Technology has made it possible for less than 2% of the U.S. population to be farmers and approximately 20% to be employed in agribusiness.**
- c) **Many advances have taken place in production agriculture due to management, technology, and agricultural research. In general, crop yields have increased and meat animals have become leaner and more cost efficient.**

Refer to Table 3.1 in the Student Reference and discuss why the production of corn has increased over the years while hours of labor have decreased. Discuss how more people can be fed through fewer hours of labor and fewer farm workers.

**Q5. How have changes in agriculture impacted U.S. history?**

**A5. Significant events in U.S. agricultural history:**

- a) **1793 - Eli Whitney invented the cotton gin.**
- b) **1836 - The grain combine was patented.**
- c) **1837 - John Deere plows were first manufactured.**
- d) **1862 - Morrill Land-Grant College Act was passed.**
- e) **1867 - Barbed wire was invented.**
- f) **1892 - John Froelich built the first gasoline tractor.**
- g) **1914 - Smith-Lever Act established the Extension Service.**
- h) **1917 - Smith-Hughes Act was passed.**
- i) **1922 - Hybrid seed corn was developed.**
- j) **1950s - Mechanization increased and commercial fertilizer was adopted.**
- k) **1960s - Herbicides and insecticides gained popularity.**
- l) **1970s - Use of confinement structures began and artificial insemination of livestock increased.**
- m) **1980s - Use of conservation tillage and computers increased.**
- n) **1990s - Global positioning systems technology emerged.**
- o) **Mid 1990s - First crops improved through biotechnology were commercialized.**
- p) **1997 - A sheep was genetically cloned from adult cells.**

Discuss the evolution of agriculture in America. Conduct AS 3.2 to have students research and create a time line of other events that have impacted U.S. agricultural history.

**F. *Other Activities***

1. Bring in a variety of food items for students to sample. Identify the state where the item or major ingredient(s) or processed product was raised and produced.



2. Have students research and report on the role of agriculture in the westward expansion of the United States.
3. Have students select a significant event in agricultural history and present a report either oral or written.
4. Students may develop pen pals in different states as a means to explore agriculture across the United States. One possibility is the discussion group on National FFA Online <<http://www.ffa.org/ffatalk.html>>.
5. Have each student write to a department of agriculture in a different state. Each student should request information about agriculture in that state such as pictures, maps, product samples, etc.

G. ***Conclusion***

The United States is fortunate to have ideal growing conditions for the production of a variety of crops and livestock. Many inventors, legislators, researchers, scientists, and entrepreneurs were instrumental in the development of agriculture in the United States. They have contributed to the efficiency and productiveness of American agriculture. At the same time, agriculture has remained true to its goal of providing food, clothing, and shelter as well as fulfilling the recent goals of protecting the environment, ensuring a safe food supply, and using technology to benefit consumers.

H. ***Answers to Activity Sheets***

AS 3.1 Census of Agriculture

See the answer to study question 1 for data from 1997.

AS 3.2 Time Line of Agriculture and History

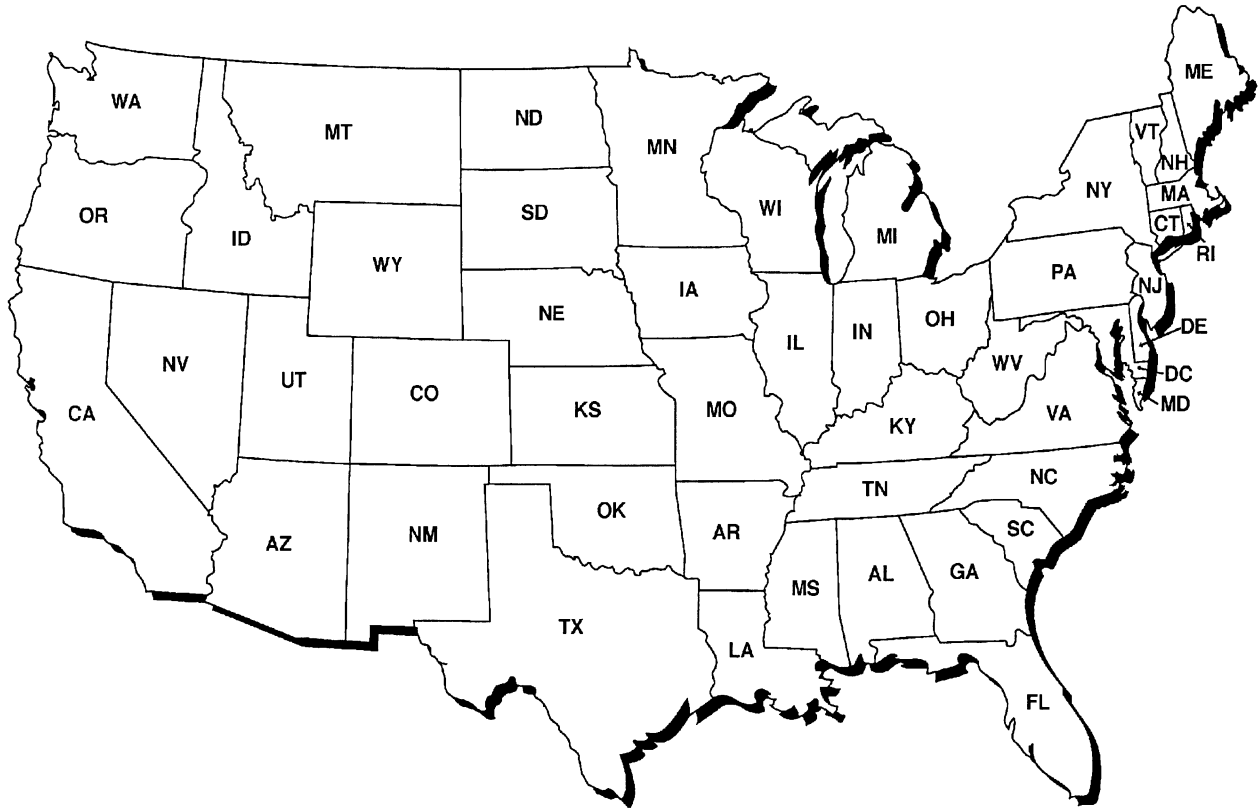
Answers will vary.

I. ***Evaluation***

A unit test is provided at the end of this unit. If a lesson quiz is needed, use questions pertaining to this lesson from the unit test.



# Map of United States





### **Census of Agriculture**

**Objective:** Students will investigate where agricultural products are grown in the United States.

**Directions:**

1. There are 26 agricultural commodities listed on AS 3.1.
2. This assignment can be completed several ways.
  - a. It may be a take-home assignment where each student completes the entire sheet.
  - b. It may be a take-home assignment where each student finds rankings for one or two products.
  - c. Teams of students could find a certain number of items.
  - d. A computer lab at school can be used for research.
3. After the information on AS 3.1 is found, each student could identify where the major production areas are in the United States using AS 3.1 Supplement or TM 3.1.
4. Have students or teams orally present where their agriculture products are primarily produced in the United States.
5. Finally, students will help develop a bulletin board with their research.
  - a. Obtain or make a large map of the United States.
  - b. Post it on a bulletin board or another area of the classroom.
  - c. Have students or teams make a symbol for the agricultural product(s) they researched. Place the symbol on the leading state(s) on the bulletin board display.



**Census of Agriculture**

**Objective:** Students will investigate where agricultural products are grown in the United States.

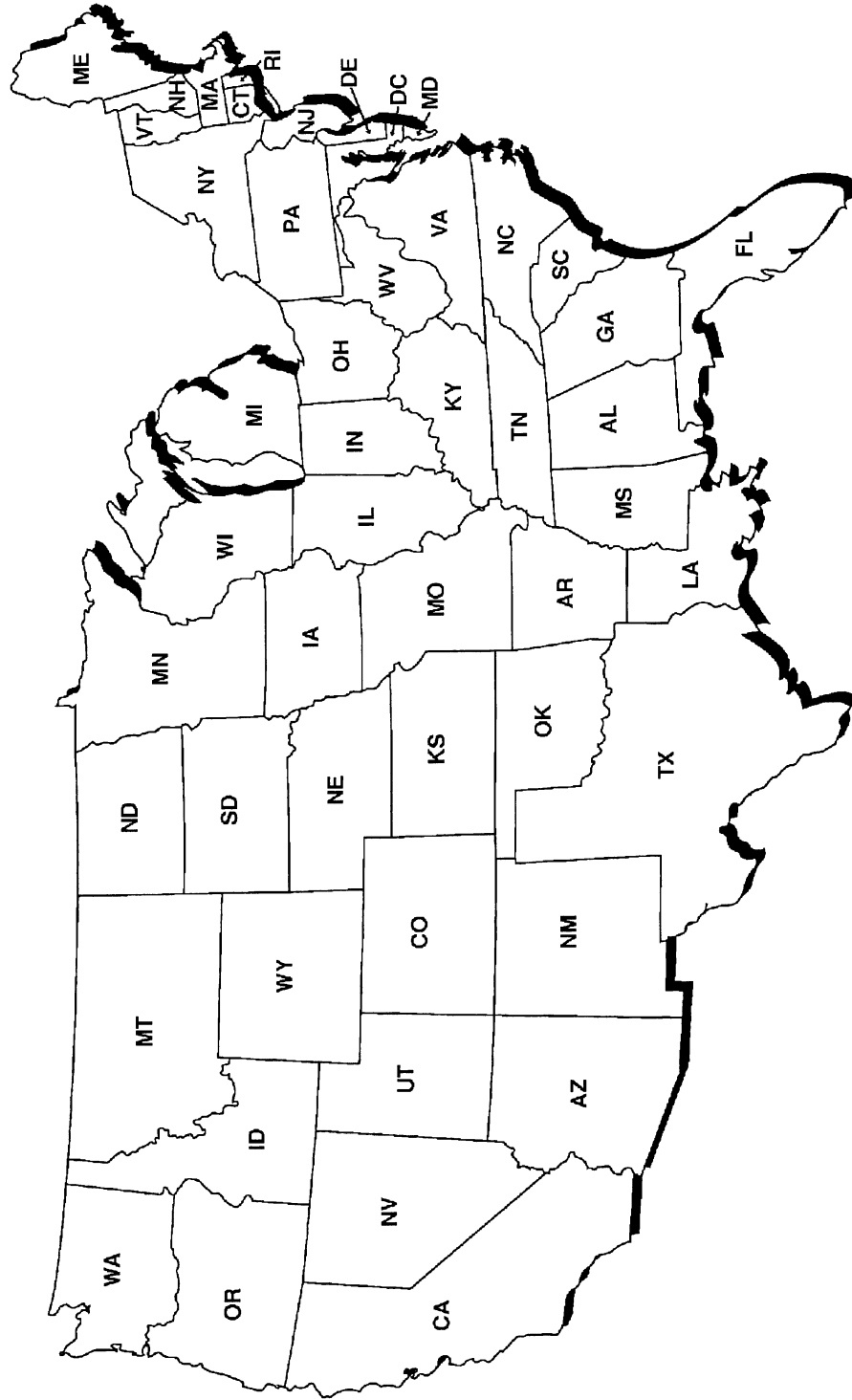
**Directions:** Using the 1997 Census of Agriculture, locate the following information. Tables with this information can be found at <<http://www.hass.usda.gov/census/census97/rankings/tablist.htm>>. Ask your instructor if information for a more recent year is available.

Agricultural Product	Leading States
Beef cows	
Market beef	
Dairy cows/products	
Market pigs	
Sheep and lambs	
Egg production (layers)	
Chickens (broilers)	
Turkeys	
Corn	
Wheat	
Soybeans	
Cotton	
Peanuts	
Potatoes	
Alfalfa hay	
Green peas	
Lettuce	
Sweet corn	
Tomatoes	
Apples	
Oranges	
Grapefruit	
Pears	
Peaches	
Pecans	
Strawberries	





Map of the United States





### **Time Line of Agriculture and History**

**Objective:** Students will discover historical events that impacted agriculture in the United States.

**Materials and Equipment:**

Poster paper that can be cut into a long time line  
Markers

**Procedure:**

1. Divide the students into groups of three to five, depending on the size of the class. Assign the groups a span of years, for example, 1750-1800, 1801-1850, 1851-1900, 1901-1950, and 1951-2000. Have them use the "Historical Impact of Changes in Agriculture" section in the Student Reference as a starting point.
2. Students will need to research other important historical events. These dates will help to integrate social studies and agriculture. Events that might be added could include dates of major wars, important inventions, formation of organizations, sporting events, legislation, etc.
3. Each group will put its time line on the poster paper.
4. Tape the time lines together and post them around the room.



## UNIT I - INTRODUCTION TO AGRICULTURE

### Lesson 4: Agriculture in Missouri

**Competency/Objective:** Describe agriculture in Missouri.

#### **Study Questions**

1. **What commodities are produced in Missouri?**
2. **Why is agriculture important in Missouri?**
3. **Why and how has Missouri agriculture changed?**

#### **References**

1. *Exploring Agriculture in America* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 2000, Unit I.
2. *Missouri Farm Facts 1999*. Missouri Department of Agriculture and U.S. Department of Agriculture. Missouri Agricultural Statistics Service, August, 1999. (Updated versions are available yearly from Missouri Agricultural Statistics Service <<http://agebb.missouri.edu/mass>>.)
3. Transparency Masters  
TM 4.1 Missouri's 1998 Ranking in the United States  
TM 4.2 How Has Missouri Agriculture Changed?
4. Handout  
HO 4.1 1997 Cash Receipts
5. Activity Sheets  
AS 4.1 Name That Drawing (Instructor)  
AS 4.2 Agricultural Commodities Produced in Missouri  
AS 4.3 Hat Day

## UNIT I - INTRODUCTION TO AGRICULTURE

### Lesson 4: Agriculture in Missouri

#### TEACHING PROCEDURES

##### A. **Review**

Agriculture is a major industry in the United States. Agricultural products provide food for U.S. consumers and are exported to several foreign countries. Agriculture is also an important industry in the state of Missouri.

##### B. **Motivation**

Conduct AS 4.1 so that students will appreciate the diverse components of Missouri agriculture.

##### C. **Assignment**

##### D. **Supervised Study**

##### E. **Discussion**

#### Q1. **What commodities are produced in Missouri?**

##### A1.

- a) **The following commodities and their rank among the other 49 states per 1998 data are as follows:**
- 1) **Number of farms - 2<sup>nd</sup>**
  - 2) **Beef cows - 2<sup>nd</sup>**
  - 3) **Grain sorghum - 4<sup>th</sup>**
  - 4) **Hay (all types)- 4<sup>th</sup>**
  - 5) **Turkeys raised - 5<sup>th</sup>**
  - 6) **Concord grapes - 6<sup>th</sup>**
  - 7) **Rice - 6<sup>th</sup>**
  - 8) **Soybeans - 6<sup>th</sup>**
  - 9) **Hogs and pigs - 7<sup>th</sup>**
  - 10) **Cheese - 9<sup>th</sup>**
  - 11) **Watermelons - 9<sup>th</sup>**
  - 12) **Broilers - 10<sup>th</sup>**
  - 13) **Corn - 10<sup>th</sup>**
  - 14) **Winter wheat - 11<sup>th</sup>**
  - 15) **Cotton - 12<sup>th</sup>**
  - 16) **Ice cream - 12<sup>th</sup>**
  - 17) **Tobacco - 12<sup>th</sup>**
  - 18) **Eggs - 14<sup>th</sup>**
  - 19) **Milk - 15<sup>th</sup>**
- b) **Logging and wood products manufacturing contribute \$3 billion each year to Missouri's economy.**
- c) **Horticultural businesses produced almost \$68 million in sales in 1998.**
- d) **Missouri is a large supplier of Golden and Red Delicious, and Jonathan apples. More than 40 million pounds of apples are produced annually.**

Divide students into groups and have them list agricultural commodities produced in Missouri. Write their answers on the board and discuss them. Next, show the left half of TM 4.1. Ask students to guess Missouri's ranking in the United States.

Have students complete AS 4.2 using copies of *Missouri Farm Facts* or the Internet <<http://agebb.missouri.edu/mass/farmfact/index.htm>>.

**Q2. Why is agriculture important in Missouri?**

**A2.**

- a) **A diversity of environmental factors enables agriculture to be produced in Missouri.**
  - 1) **Geography**
  - 2) **Vegetation**
  - 3) **Climate**
  - 4) **Soil fertility**
- b) **The value of agricultural products produced in Missouri each year is approximately \$4.5 billion.**
- c) **In addition to production agriculture, many people are employed in other areas of the agricultural industry.**
  - 2) **Agribusiness employs more than 15% of Missouri's labor force, which is one in every six workers in the state, or more than 400,000 people.**
  - 3) **The agricultural processing and marketing sector employs approximately 92,000 people.**

Missouri produces a variety of crops and other agricultural products. Use HO 4.1 to identify Missouri counties where crop and livestock production is concentrated. (The instructor should update the handout using the most current *Missouri Farm Facts*.) Conduct AS 4.3 to familiarize students with various agricultural careers.

**Q3. How has Missouri agriculture changed?**

**A3.**

- a) **Medium-size farms have declined the most.**
- b) **The average size of farms has increased.**
- c) **The average age of producers has increased.**
- d) **There are lower numbers of producers under the age of 35.**
- e) **Agricultural businesses are hiring more employees, especially females.**
- f) **Producers are continuing to adopt new technology.**
- g) **More attention is paid to soil conservation and water quality.**
- h) **The trend has been toward larger farming operations, the formation of farmer cooperatives, and the consolidation of agricultural businesses.**
- i) **The number of businesses involved in biotechnology and life sciences are increasing in Missouri.**

Use TM 4.2 to discuss changes in Missouri agriculture.

**F. *Other Activities***

- 1. Use the Missouri Agricultural Statistics service <<http://agebb.missouri.edu/mass/index.htm>> and county Agri-Facts to identify key information about your county.
- 2. Ask a representative from the Missouri Department of Agriculture or the Cooperative Extension Service to talk to the class.

3. Have students write for their own copy of *Missouri Farm Facts* for home. They can request a copy from Missouri Agricultural Statistics Service, P.O. Box L, Columbia, MO 65205, (573) 876-0950, <<http://agebb.missouri.edu/mass>>.

G. **Conclusion**

Agriculture is very diverse in Missouri and is the most important industry. Agricultural production provides raw products, agricultural business, and career opportunities that directly contribute to the state's economy. More than 15% of Missouri's labor force is employed in agribusiness. Missouri products are used by consumers in the state, across the United States, and throughout the world. Missouri has changed and will continue to change agriculturally. However, the importance of the industry to the economy of the state will continue.

H. **Answers to Activity Sheets**

AS 4.1 Name That Drawing

There are no answers for this activity.

AS 4.2 Agricultural Commodities Produced in Missouri

Answers should be checked to the most current *Missouri Farm Facts*. The answers given below are for 1998 production.

Commodity	Area of Production
Corn	Northern half and Bootheel
Cotton	Bootheel
Wheat	North central and Bootheel
Soybeans	Northwest, north central, and Bootheel
Hay	Southwest
Dairy cattle	Southwest
Hogs and pigs	North and north central
Beef cows	Southwest
Sheep and lambs	Northern third
Grain sorghum	West central, central and Bootheel
Rice	Bootheel
Tobacco	Missouri River bottom

AS 4.3 Hat Day

The instructor should determine if the answers are appropriate.

I. **Evaluation**

A unit test is provided at the end of this unit. If a lesson quiz is needed, use questions pertaining to this lesson from the unit test.



## Missouri's 1998 Ranking in the United States

Category/Commodity	Rank
Number of farms	2 <sup>nd</sup>
Beef cows	2 <sup>nd</sup>
Grain sorghum	4 <sup>th</sup>
Hay (all types)	4 <sup>th</sup>
Turkeys raised	5 <sup>th</sup>
Concord grapes	6 <sup>th</sup>
Rice	6 <sup>th</sup>
Soybeans	6 <sup>th</sup>
Hogs and pigs	7 <sup>th</sup>
Cheese	9 <sup>th</sup>
Watermelons	9 <sup>th</sup>
Broilers	10 <sup>th</sup>
Corn	10 <sup>th</sup>
Winter wheat	11 <sup>th</sup>
Cotton	12 <sup>th</sup>
Ice cream	12 <sup>th</sup>
Tobacco	12 <sup>th</sup>
Eggs	14 <sup>th</sup>
Milk	15 <sup>th</sup>

Source: *Missouri Farm Facts 1999*



# How Has Missouri Agriculture Changed?

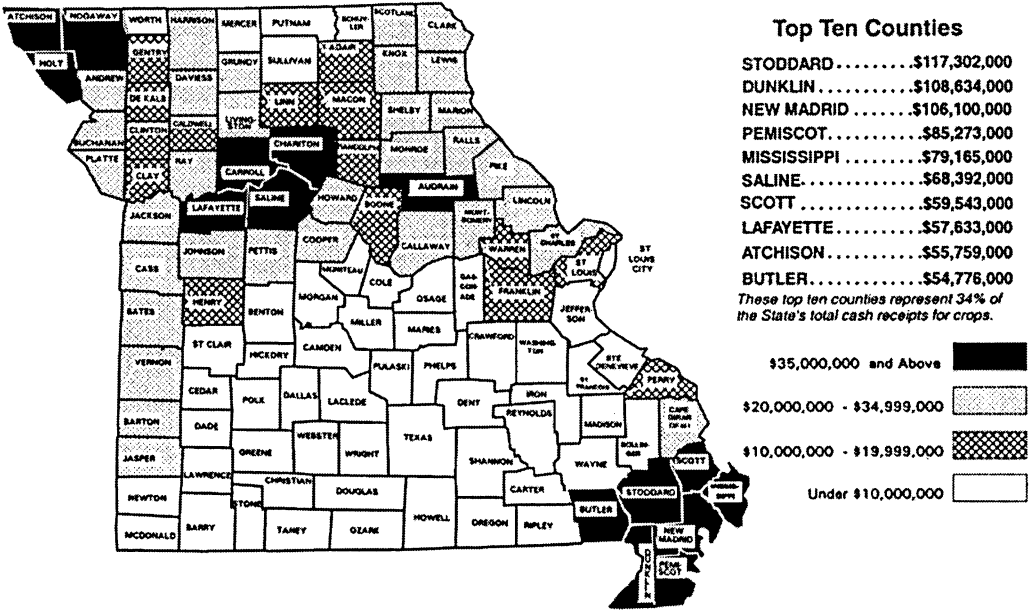
Variable	Year	
	1982	1997
Land in farms (acres)	29,266,609	28,826,182
Percent of land in farms	66.3	65.3
Number of farms	112,447	98,860
Average size of farm (acres)	260	292
Number of farm operators by age		
• under 25	3,606	1,257
• 25-34	14,231	7,133
• 35-44	21,546	18,523
• 45-54	24,517	22,285
• 55-64	25,924	22,192
• 65 years or older	22,623	27,470
Average age of producers	51	55
Operator's principal occupation (percent)		
• Farming	52	45
• Other	48	55
Farms by value of sales (number)		
• Less than \$9,999	61,236	54,982
• \$10,000-\$49,999	32,053	26,664
• \$50,000-\$99,999	10,004	6,529
• \$100,000 or more	9,126	10,685

Source: Missouri Farm Facts 1999

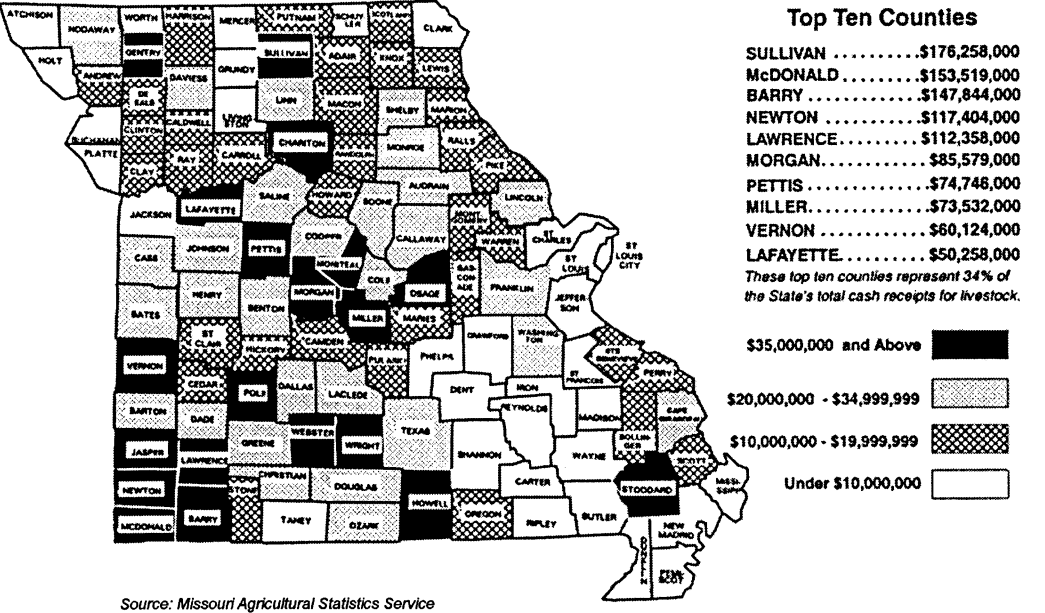


# 1997 Cash Receipts

## 1997 Cash Receipts, Crops By Counties



## 1997 Cash Receipts, Livestock By Counties



Source: Missouri Agricultural Statistics Service



**Name That Drawing**

**Objective:** Students will understand different components of Missouri agriculture.

**Materials and Equipment:**

- Poster paper, white board, or blackboard
- Markers or colored chalk
- Note cards

**Procedure:**

1. Write each of the words listed below for the four concepts on separate note cards.
2. Divide the class into four teams of four to six students. Each team will be given a set of cards for a specific concept. (If there are more students in the class, additional concepts should be developed.)
3. Explain the rules below:
  - a. Each team will select a person to draw an image to represent the word on the card.
  - b. All the words lead to a concept and each of the concepts has a commonality.
  - c. Each word is worth 5 points, the concept is worth 10 points, and the commonality is worth 15 points.
  - d. There is no talking between the team members and the person drawing.
  - e. Each team will have 2 minutes to guess all of its words and solve the concept puzzle.
  - f. The person drawing may pass on one word.
  - g. If a team does not correctly state its concept, each of the other teams can write the answer on a note card and gain the 10 points.
  - h. At the end of the game, each team will write its answer (commonality) on a note card.
4. The following are examples of words that can be used.

Words

- Corn
- Tractor
- Planter
- Soil
- Weeds

Words

- Pig
- Cow
- Lamb
- Steak
- Feed

Words

- Lawn
- Flower
- Greenhouse
- Tree
- Vegetable

Words

- DNA
- Cloning
- Laboratory
- Scientist

Concept

Agronomy

Concept

Livestock or Animals

Concept

Horticulture

Concept

Biotechnology

Commonality

The concepts should build to the commonality that all describe agriculture in Missouri.





Lesson 4: Agriculture in Missouri

Name \_\_\_\_\_

**Agricultural Commodities Produced in Missouri**

**Objective:** Students will identify where major commodities are produced in Missouri.

**Directions:** Twelve agricultural commodities produced in Missouri are listed below. Using *Missouri Farm Facts*, identify areas of the state that have high concentrations of the commodity listed. Some information may be found on the Internet at <<http://agebb.missouri.edu/mass/farmfact/index.htm>>. One commodity has been done for you.

Commodity	Area of Production
Corn	Northern half and Bootheel
Cotton	
Wheat	
Soybeans	
Hay	
Dairy cattle	
Hogs and pigs	
Beef cows	
Sheep and lambs	
Grain sorghum	
Rice	
Tobacco	



**Hat Day**

**Objective:** Students will identify various jobs or careers in agriculture.

**Directions:** Interview a person who has a job in agriculture and answer the questions below. Role-play the person's job by wearing the hat to class and explaining what the person does.

1. Name of person you interviewed \_\_\_\_\_
2. Job title \_\_\_\_\_
3. Name of the business the person works for \_\_\_\_\_
4. Major sector of agriculture (one of seven identified in Unit I, Lesson 1)  
\_\_\_\_\_
5. What did you find out about the person's job?
  - a. Responsibilities \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  - b. Favorable aspects \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  - c. Least favorable aspects \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  - d. Advice \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## UNIT I - INTRODUCTION TO AGRICULTURE

### Lesson 5: Advances in Agricultural Technology

**Competency/Objective:** Identify advances in agricultural technology and their implications.

#### **Study Questions**

1. **What are recent changes in agriculture?**
2. **How will agriculture change in the future?**
3. **What are the implications of changes in agriculture?**

#### **References**

1. *Exploring Agriculture in America* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 2000, Unit I.
2. Activity Sheets  
AS 5.1 The Future and Change (Instructor)  
AS 5.2 Future Headlines (Instructor)  
AS 5.3 Invent a New Product for 2020

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### Lesson 5: Advances in Agricultural Technology

#### TEACHING PROCEDURES

##### A. **Review**

Agriculture is a diverse industry. Many discoveries have been made in recent years that keep American agriculture on the leading edge of technology. There is a bright future for agriculture in America and for the people of this nation and the world. In this lesson, breakthroughs in agricultural technology and their effects on food and fiber production will be discussed.

##### B. **Motivation**

1. Pass out small, individual boxes of raisins to each student. While they eat the raisins, ask them to guess how much time it takes to process grapes into raisins. They should estimate the time needed to dump the product into the hopper, de-stem, sort by size and quality, wash, dry, package, and stack the containers. Write the students' answers on the board. The correct answer is 8 minutes. Show the video *Green Cows, Quags, and Mummies* available from the Missouri Resource Center for Career & Technical Education. Many of the concepts in the video have taken place. Discuss how technology will affect the production and marketing of food products in the future.
2. Using a microwave, cook two kinds of hot dogs, cut them into pieces, and have the students sample each. One package should be "all-beef" hot dogs. The other package should be made of turkey, chicken, or soybean products. Conduct a taste test to see which hot dogs students prefer. Explain the differences in the cost of the two products.

##### C. **Assignment**

##### D. **Supervised Study**

##### E. **Discussion**

#### Q1. What are recent changes in agriculture?

##### A1.

- a) **Computers**
  - 1) **Maintenance of management records**
  - 2) **Communication by e-mail**
  - 3) **Information through the Internet**
  - 4) **Environmental monitoring of facilities**
  - 5) **Computer chips for animal identification**
- b) **Mechanical**
  - 1) **Electronic monitoring**
  - 2) **Laser-guided equipment**
  - 3) **Surveying instruments**
  - 4) **Robotics**
- c) **Livestock management**
  - 1) **Automated systems of feeding, watering, and waste disposal**
  - 2) **Totally controlled environments**
  - 3) **Increased building size and more located in areas favorable for production**
- d) **Embryo transfer**

- 1) Eggs from superior female animals implanted into recipient females
- 2) Multiple offspring from one animal in a year
- e) Cloning
  - 1) Fertilized egg reproduced to create identical individual
  - 2) Individuals with superior genetics produced
- f) Genetically-modified crops or genetically-modified organisms (GMOs)
  - 1) Corn resistant to corn borer
  - 2) Soybeans resistant to herbicides
- g) Precision agriculture
  - 1) More efficiency through use of global positioning systems (GPSs)
  - 2) "Farming by the inch" made possible

Present AS 5.1 to students and discuss how advancements in agricultural research continue to change America.

**Q2. How will agriculture change in the future?**

**A2.**

- a) Biotechnology and precision agriculture will increase production.
- b) Crop yields will increase.
- c) Machinery and animals will become more cost efficient.
- d) Value added to products will create new uses for by-products.
- e) Combining science, agriculture, food, and health research will result in new products.

Technology has increased the production efficiency of American producers. New methods, equipment, and techniques have been developed to improve the quantity and quality of agricultural production. Some of the technology is very expensive and must be modified before it can be adopted in agriculture. Conduct AS 5.2 to get students thinking about future events.

**Q3. What are the implications of changes in agriculture?**

**A3.**

- a) The challenge is to continue to increase agricultural productivity with about the same amount of land.
- b) Global trade has increased and its importance must be recognized.
- c) New career opportunities will be created.

Have students complete AS 5.3 to stimulate their thinking about agricultural inventions that would be useful in the future.

**F. *Other Activities***

1. Invite a veterinarian, agronomist, or biotechnologist to class to discuss advances in technology.
2. Conduct a class experiment on hydroponics, growing plants in nutrient solutions without soil.
3. Have students do research papers on biotechnology.
4. Have students write an essay on what their town will be like in 50 years.
5. Invite a retired farmer to class to explain how technology has changed in agriculture.

G. **Conclusion**

Agriculture has and will continue to change. The fundamental goal will be to continue to produce quality food and fiber for the increasing population. New technology and research will help to increase productivity without compromising resources. Preserving natural resources is a top concern for everyone in agriculture. There will be many career opportunities in agriculture as the demand for food and fiber continues to increase.

H. **Answers to Activity Sheets**

AS 5.1 The Future and Change

There are no answers for this activity.

AS 5.2 Future Headlines

There are no answers for this activity.

AS 5.3 Invent a New Product for 2020

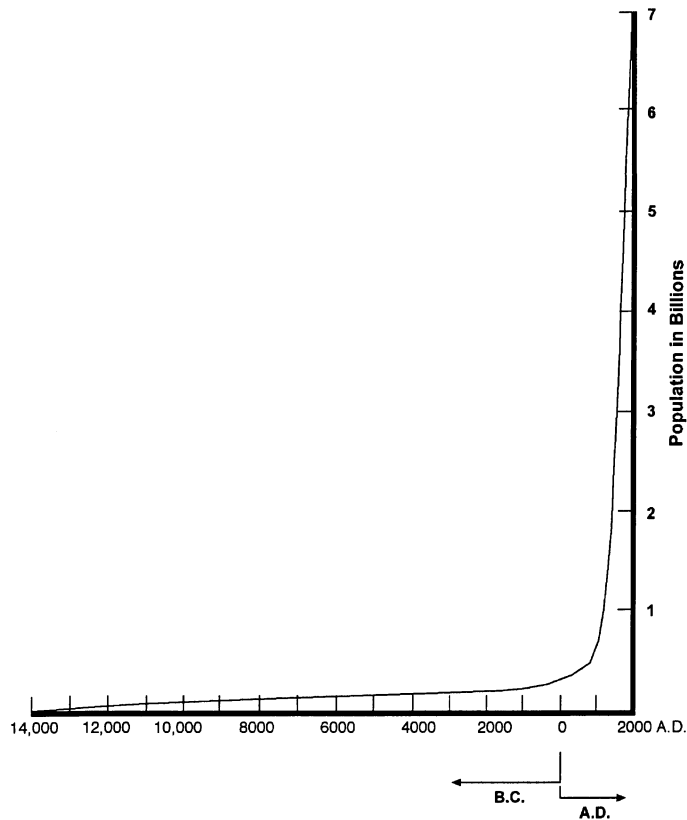
The instructor should determine if the answers are appropriate.

I. **Answers to Evaluation**

1. c
2. a
3. d
4. a
5. b
6. b
7. c
8. d
9. a
10. c
11. b
12. d
13. b
14. c
15. d
16. c
17. d
18. a
19. c



20.



21. Any two of the following are correct: agriculture is more than farming, agriculture is the country's largest employer, variety of careers and opportunities, or bright future.
22. The instructor will need to determine if the answer is appropriate. Any one of the following is a suggested answer: hybrid seed corn developed, tractors replaced horses on farms, commercial fertilizers adopted, or crops improved through biotechnology.
23. a
24. c
25. c
26. f or g
27. c
28. c or b
29. e
30. e
31. e
32. b
33. d or g
34. c
35. f or e
36. g
37. c
38. f or e
39. c
40. c
41. g or c

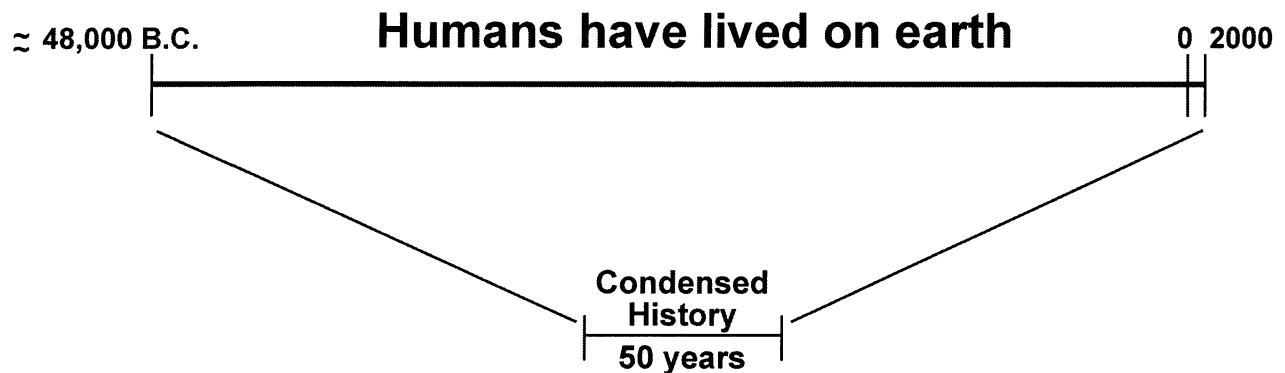


### The Future and Change

**Objective:** Students will gain perspective of the time humans have existed and will make predictions about the future.

**Directions:** Have students discuss the following questions.

1. Ask students how long people have been around. Many answers will be given. Lead the group into agreeing on the following scenario that can be put on the blackboard.



2. Read the following information to students. Fill in the correct dates or have students create a time line that could include more events that are significant to students.

There are many ideas about how long humans have been on the earth. According to some scientists, humans have lived on this planet about 50,000 years. Due to our limited time on earth, it is practically impossible for anyone to accurately conceive 50,000 years. However, to provide a reference, imagine that everything that has happened to humans has occurred in a reduced period of time, namely, 50 years. With the scale so reduced, here is a scenario of what has happened:

- 11 years ago, or in \_\_\_\_\_, humans stopped living in caves.
- 5 years ago, or in \_\_\_\_\_, picture writing was invented.
- 2 years ago, or in \_\_\_\_\_, Christianity began.
- Approximately 8 months ago, \_\_\_\_\_, the printing press was invented.
- 10 days ago, electricity was discovered.
- Yesterday, the Wright brothers flew their first airplane at Kitty Hawk.
- Television was invented this morning.
- Jets came into being since we began talking about the future and change.
- The last 60 seconds brought about all our operations in space.
- The computer was invented in the last 20 seconds.

Just about every convenience that makes up our material world, from cars to jets, has been invented within the last 24 hours.

3. What will education and the world be like in the new millennium? Technological advances change our lives on a daily basis.



### Future Headlines

**Objective:** Students will consider possibilities for future society.

**Materials and Equipment:**

Overhead transparencies  
Markers

**Procedure:**

1. Have students individually respond to the following question at the beginning of class, or assign this question as homework for the next day.

What do you predict will be the newspaper headlines in the year 2020?

Instruct them that agriculture has to be one of the areas for their predictions.

2. Review with students the basic rules of brainstorming.
  - a. Write down every idea.
  - b. Every idea or suggestion is a possibility (no put downs allowed).
  - c. The objective is to generate as long a list of ideas as possible.
  - d. The procedure is to go around the circle with each person offering one idea at a time.
3. Divide students into groups of three to five, depending on the size of the class.
4. After brainstorming, distribute the transparencies and markers to each group. Instruct the students to identify at least five of their favorite headlines, of which at least one must pertain to agriculture. (Sports, movies, music, cars, etc. are other possibilities.)
5. Have the groups share their headlines and discuss what the effects would be if their predictions were to happen.



**Invent a New Product for 2020**

**Objective:** Students will develop an idea for an invention that will be useful in the future of agriculture.

**Directions:**

1. Use magazines, books, agribusiness material, the Internet, etc., to research the latest in agricultural technology.
2. Use this research to invent a new agricultural product to be marketed in 2020.
3. Write a report that briefly explains the new product, its intended use, and its biggest advantage over the competition. Attach the magazine article, agribusiness material, or Internet information you used for research on the topic.
4. Prepare a brief oral report about your new invention.





UNIT EVALUATION

Circle the letter that corresponds to the best answer.

1. What is the meaning of the word agriculture in Latin?
  - a. Culture of growers
  - b. Merger of humankind and the environment
  - c. Science and art of cultivating the soil
  - d. Art of plants and animals
  
2. The largest industry in the United States is \_\_\_\_\_.
  - a. Agriculture
  - b. Automotive manufacturing
  - c. Computer technology
  - d. Transportation
  
3. Approximately \_\_\_\_\_ % of the jobs in the United States are related to agriculture.
  - a. 2
  - b. 5
  - c. 10
  - d. 20
  
4. Less than \_\_\_\_\_ % of the U.S. population are farmers.
  - a. 2
  - b. 5
  - c. 10
  - d. 20
  
5. The average American family spends approximately \_\_\_\_\_ % of its income for food.
  - a. 5
  - b. 11
  - c. 25
  - d. 32
  
6. Compared to other countries in the world, people in the United States enjoy \_\_\_\_\_ food prices and have \_\_\_\_\_ life expectancies.
  - a. Low, average
  - b. Low, long
  - c. Average, long
  - d. High, average

7. All of the following are top U.S. agricultural exports except \_\_\_\_\_.
- a. Soybeans
  - b. Consumer food (e.g., beef, pork, lamb)
  - c. Petroleum products
  - d. Grains (e.g., corn, oats, barley, sorghum, rye)
8. Agricultural differences throughout the world do not include \_\_\_\_\_.
- a. Climate
  - b. Soil fertility
  - c. Topography
  - d. Population
9. The United States imports \_\_\_\_\_ from Columbia, Brazil, and Mexico.
- a. Coffee
  - b. Automobiles
  - c. Petroleum products
  - d. Olives
10. In general, livestock production in the United States is located \_\_\_\_\_.
- a. In warmer regions
  - b. By research facilities
  - c. Where crops used for livestock food is readily available
  - d. On wheat farms
11. Which of the following choices is not a factor in why agriculture is successful in the United States?
- a. Favorable growing conditions
  - b. Good ventilation
  - c. Fertile soil
  - d. Many leaders, inventors, researchers, and scientists
12. One of the goals of U.S. agriculture is to \_\_\_\_\_.
- a. Learn how to grow bananas
  - b. Maintain traditions
  - c. Devote more land to farming
  - d. Protect the environment
13. Most of the first settlers who came to the United States were \_\_\_\_\_.
- a. Ship builders
  - b. Farmers
  - c. Blacksmiths
  - d. Carpenters
14. Based on statistics from 1998, Missouri is second in \_\_\_\_\_.
- a. Winter wheat and rice
  - b. Hay and cheese
  - c. Number of farms and number of beef cows
  - d. Turkeys and number of farmers

15. Missouri's hilly and wooded areas in the \_\_\_\_\_ provide timber, pasture, and favorable weather for growing fruits and vegetables.
- Central region
  - Northwest region
  - Northeast region
  - Ozarks
16. One of the ways Missouri agriculture has changed is that the \_\_\_\_\_.
- Medium-size farms have increased
  - Average age of producers has decreased
  - Number of producers under the age of 35 has decreased
  - Hiring in agribusinesses has declined
17. Which of the following choices is not a recent change in agriculture?
- Computer technology
  - Embryo transfer
  - Genetically-modified crops
  - Commercial fertilizer
18. One of the predicted changes for agriculture is \_\_\_\_\_.
- Increased crop yields
  - Machinery and animals will become obsolete
  - Biotechnology will decrease production
  - Precision farming will be phased out
19. Which of the following statements is not one of the implications of agricultural change?
- Crop yields will increase using the same amount of land.
  - Global trade will become increasingly important.
  - The United States will isolate itself from the world market.
  - New career opportunities will be created.

**Complete the following short-answer questions.**

20. Identify how world population has changed through history. Explain this by drawing a graph and properly labeling the horizontal axis (years) and vertical axis (population).

21. A fellow student asks you about the career opportunities in agriculture. What are two important points to tell the student?
- a.
  - b.
22. There are many important events in U.S. agricultural history. Identify one that you personally consider significant and justify your selection.

**Match the career area of agriculture (a-g) with the job title. All are used at least once. Some job titles could have several answers, however select the one that describes its major job responsibility.**

- |           |                                    |    |                                       |
|-----------|------------------------------------|----|---------------------------------------|
| 23. _____ | Agricultural Electrician           | a. | Agricultural systems technology       |
| 24. _____ | Agricultural Journalist            | b. | Agricultural processing and marketing |
| 25. _____ | Agricultural Loan Officer (Banker) | c. | Agricultural supplies and services    |
| 26. _____ | Beekeeper                          | d. | Forestry                              |
| 27. _____ | Farm Broadcaster                   | e. | Horticulture                          |
| 28. _____ | Federal Meat Inspector             | f. | Production agriculture                |
| 29. _____ | Floral Designer                    | g. | Natural Resources                     |
| 30. _____ | Greenhouse Manager                 |    |                                       |
| 31. _____ | Landscape Architect                |    |                                       |
| 32. _____ | Meat Department Manager            |    |                                       |
| 33. _____ | Park Ranger                        |    |                                       |
| 34. _____ | Pet Shop Operator                  |    |                                       |
| 35. _____ | Raspberry Grower                   |    |                                       |
| 36. _____ | Soil Conservationist               |    |                                       |
| 37. _____ | University Professor               |    |                                       |
| 38. _____ | Vegetable Producer                 |    |                                       |
| 39. _____ | Veterinarian                       |    |                                       |
| 40. _____ | Youth Leader (4-H)                 |    |                                       |
| 41. _____ | Zoo Manager                        |    |                                       |