

Cotton...Touching Us Daily

Objective The students will learn the steps cotton goes through to become the clothes we wear.

Length of Unit 3 days

Grade Level 1-3 4-6

TEKS:

E1.1A, 1.15A, 2.1A, 2.9I, 3.1A LA4.7C,E, 4.9A, 5.13C 6.7A,B
SS1.6B,C, 2.4A,B, 2.10C, 3.15A SS4.14B, 5.4F, 5.14A

TAKS:

Reading	1, 2
Writing	2, 3
Math	5, 12

Materials and Equipment

"Countdown to Cotton" Booklets
"Texas...Where Cotton is King!" Activity Sheets
U.S. Maps
Overhead Projector
Miniature Cotton Gin — Available through County Extension Agent

Assessment

1. The students will complete booklet "Countdown to Cotton", placing the production and processing steps in the proper sequence.
2. The students will complete maps and graphs on cotton in Texas and the U.S.
3. Students will complete grade appropriate activities.
4. Teacher observation.

Background Information National Cotton Council, "The Story of Cotton", included in lesson
National Cotton Council website: www.cotton.org

Cotton...Touching Us Daily!

Procedure

1. Introduce new vocabulary:

Grades 1-3

gin

bale

textile

boll

Eli Whitney

lint

linters

Grades 4-6

processing

module

loom

1. Have students look at each others shirt tags and count how many are wearing cotton shirts. Show students other things made from cotton such as cotton balls, shoe strings, Q-Tips etc. Have students name other products made from cotton.
2. Grades 1-3: High light selected parts of "The Story of Cotton" and read to students, emphasizing vocabulary words
Grades 4-6: Have students read each section of "The Story of Cotton" and discuss.
3. Discuss the steps in cotton production and processing. Have students complete "Production Steps Scramble".
4. Have students complete booklet "Countdown to Cotton" using pictures and production steps included in lesson.
5. Have students complete the cotton and graphing activities.
6. On the U.S. map have students locate and color the Cotton Belt states.

Extension

1. Contact your County Extension Agent or County Farm Bureau for a farmer in the area who grows cotton and have him visit and speak to the class.
2. Request the miniature cotton gin from your County Extension Agent and demonstrate how cotton is ginned.
3. Have students research and report on the historic significance of cotton in the U.S.
4. Have students research the contribution made by Eli Whitney to the cotton industry.

THE STORY OF COTTON

Nature's Food & Fiber Plant

History of Cotton

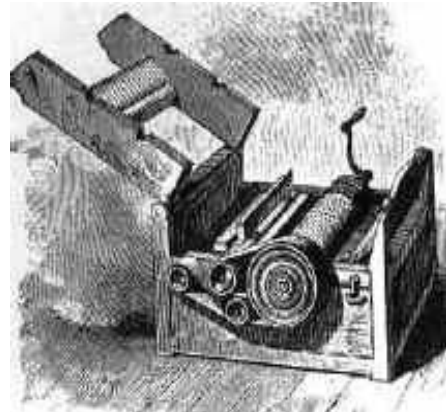
No one knows exactly how old cotton is. Scientists searching caves in Mexico found bits of cotton bolls and pieces of cotton cloth that proved to be at least 7,000 years old. They also found that the cotton itself was much like that grown in America today.

In the Indus River Valley in Pakistan, cotton was being grown, spun, and woven into cloth 3,000 years before the birth of Christ. At about the same time, natives of Egypt's Nile Valley were making and wearing cotton clothing.

Arab merchants brought cotton cloth to Europe about 800 A.D. When Columbus discovered America in 1492, he found cotton growing in the Bahama Islands. By 1500, cotton was known generally throughout the world.

Cotton seed are believed to have been planted in Florida in 1556 and in Virginia in 1607. By 1616, colonists were growing cotton along the James River in Virginia.

Cotton was first spun by machinery in England in 1730. The industrial revolution in England and the invention of the gin in the United States paved the way for the important place cotton holds in the world today.



Eli Whitney, a native of Massachusetts, got his idea for the cotton gin while watching workers on a plantation in Georgia separate the fiber from the seed by hand. In 10 days, he built a machine that did the work 50 times faster. He called it a "gin" - short for engine - and secured a patent on it in 1793.

His invention made it possible to supply large quantities of cotton fiber to the fast-growing textile industry. Within 10 years, the value of the U.S. cotton crop rose from \$150,000 to more than \$8 million.

THE IMPORTANCE OF COTTON

Today, the world uses more cotton than any other fiber, and cotton is a leading cash crop in the United States. At the farm level alone, the production of each year's crop involves the purchase of more than \$4 billion worth of supplies and services. This stimulates business activities for factories and enterprises throughout the country. Processing and handling of cotton after it leaves the

farm generates even more business activity. Altogether, business revenue stimulated by cotton is estimated at 122.4 billion—the greatest of any U.S. crop.

Cotton is a part of our daily lives from the time we dry our faces on a soft cotton towel in the morning until we slide between fresh cotton sheets at night. It has hundreds of uses, from blue jeans to shoe strings. Clothing and household items are the largest uses, but industrial products account for many thousands of bales.

All parts of the cotton plant are useful. The most important is the fiber or lint, which is used in making cotton cloth. Linters—the short fuzz on the seed—provide cellulose for making plastics, explosives and other products. Linters also are incorporated into high quality paper products and processed into batting for padding mattresses, furniture and automobile cushions.

The cotton seed is crushed in order to separate its three products—oil, meal and hulls. Cotton seed oil is used primarily for shortening, cooking oil and salad dressing. The meal and hulls that remain are used either separately or in combination as livestock, poultry and fish feed and as fertilizer. The stalks and leaves of the cotton plant are plowed under to enrich the soil.

Some cotton seed also is used as a high-protein concentrate in baked goods and other food products.

WHERE COTTON GROWS


Cotton grows in warm climates and most of the world's cotton is grown in the United States, the Soviet Union, the People's Republic of China, and India. Other leading cotton-growing countries are Brazil, Pakistan, and Turkey.

In this country, the 14 major cotton-producing states are: Alabama, Arizona, Arkansas, California, Georgia, Louisiana, Mississippi, Missouri, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas. Some cotton also is produced in Florida, Kansas, and Virginia.

The yield in the United States now averages approximately 1 1/3 bales per acre. A U.S. bale weighs around 500 pounds. This yield is about twice as much as in 1950 and is due to better land use, improved plant varieties, mechanization, fertilization, and irrigation. It also is a result of much better control of disease, weeds, and insects. A major part of the credit for this progress goes to scientists working at experiment stations and in laboratories, and to agricultural extension workers who bring the findings to farmers.

HOW COTTON IS GROWN

After cotton has been harvested in the fall, the stalks are cut down and turned under the soil. In the spring, the land is plowed again and the soil is broken up

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and formed into rows. Farmers in south Texas plant cotton as early as February. In Missouri and other northern parts of the Cotton Belt, they plant as late as June.

Seeding is done with mechanical planters which cover as many as 10 to 12 rows at a time. The planter opens a small trench or furrow in each row, drops in the right amount of seed, covers them, and packs the earth on top of them.

The seed is planted at uniform intervals in either small clumps ("hill-dropped") or singularly ("drilled").

Machines called cultivators are used to uproot weeds and grass, which compete with the cotton plant for soil nutrients, sunlight, and water.

About two months after planting, flower buds called squares appear on the cotton plants. In another three weeks, the blossoms open. Their petals change from creamy white to yellow, pink and, finally, dark red. After three days, they wither and fall, leaving green pods which are called cotton bolls.

Inside the boll, which is shaped like a tiny football, moist fibers grow and push out from the newly formed seeds. As the boll ripens, it turns brown. The fibers continue to expand under the warm sun. Finally, they split the boll apart and the fluffy cotton bursts forth. It looks like white cotton candy.

The crop is harvested by machines which gather cotton 50 times faster than workers used to pick by hand.

HOW COTTON IS GINNED AND MARKETED

After harvesting, cotton is either stored at the edge of the field in big mounds called "modules" or loaded on trailers or trucks and transported to the gin. Powerful pipes suck the cotton into the building and through cleaning machines that remove the "trash" such as burs, dirt, stems, and leaf material from the cotton. Then it goes to the gin stand where circular saws with small, sharp teeth pull the fiber from the seed.

From the gin, fiber and seed go different ways. The ginned fiber, now called lint, is pressed together and made into great bales weighing about 500 pounds. To determine the value of the cotton, samples are taken from each bale and classed according to fiber length (staple), strength, width, color, and cleanness. Growers usually sell their cotton to a local buyer or merchant who, in turn, sells it to a textile mill either in the United States or a foreign country.

The seed usually is sold by the grower to the gin. The ginner either sells the seed for feed or to an oil mill where the linters (downy fuzz) are removed in an operation very much like ginning. Linters are baled and sold to the paper, batting, and plastics industries, while the seed is processed into cottonseed oil, meal, and hulls.

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HOW COTTON IS SPUN AND WOVEN

At the textile mill, the bales are opened by machines, and the lint is mixed and cleaned further by blowing and beating. The short lint that comes out usually is separated and sold for use in other industries. The best part of the lint consists of fibers about 1 inch to 1 3/4 inches long.

The mixed and fluffed up cotton goes into a carding machine which cleans the fibers some more and makes them lie side by side. A combing machine finishes the job of cleaning and straightening the fibers and makes them into a soft, untwisted rope called a sliver (pronounced *sly-ver*).

Two more machines - a drawing frame and a slubber - pull the soft rope thinner and give it the first twist. When the fiber leaves the slubber, it is called roving and goes through other machines which twist and pull it some more. Finally, it reaches the spinning frame which gives a last pull and twist. The fiber leaves the spinning frame wound on bobbins as cotton yarn.

Machines called looms weave cotton yarns into fabrics the same way the first hand-weaving frames did. Modern looms work at great speeds, interlacing the lengthwise yarns (warp) and the crosswise yarns (filling). The woven fabric, called gray goods, is sent to a finishing plant where it is bleached, pre-shrunk, dyed, printed, and given a special finish before being made into clothing or products for the home.

This, then, is the story of cotton - where and how it is grown, marketed, processed, and manufactured into the many useful products that have served the world so well for so long. It is a never-ending story, as scientists continue to develop better ways to produce and use one of the world's oldest fibers - cotton.

Courtesy of National Cotton Council

What Can You Make From a Bale of Cotton?

A bale of cotton weighs about 480 pounds. One bale of cotton can make 1,217 men's T-shirts or 313,600 \$100 bills. Here are some things that are made from a bale of cotton.

Women's



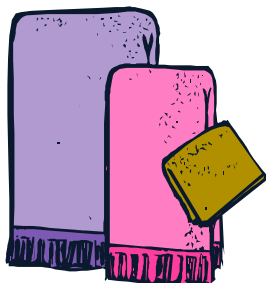
Handkerchiefs 21,960
Dresses 274
Brassieres 6,460
Knit panties 6,436



Jeans 249
Skirts 409
Mid-calf socks 4,321
Woven blouses 773

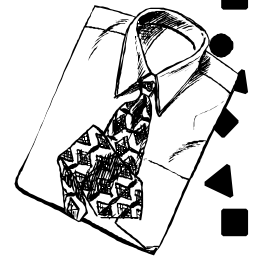


Sweaters 379
Nightgowns 780
Woven slacks 415
Shorts 733



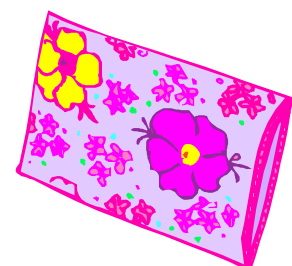
Men's

Handkerchiefs 8,347
Woven dress shirts 765
Woven sport shirts 906
Work shirts 543
Boxer shorts 2,104
Jockey shorts 2,419
Sleeveless undershirts 1,943
Dress and sport trousers 484
Work trousers 374
Work gloves 1,918
Mid-calf socks 3,557
Jeans 215

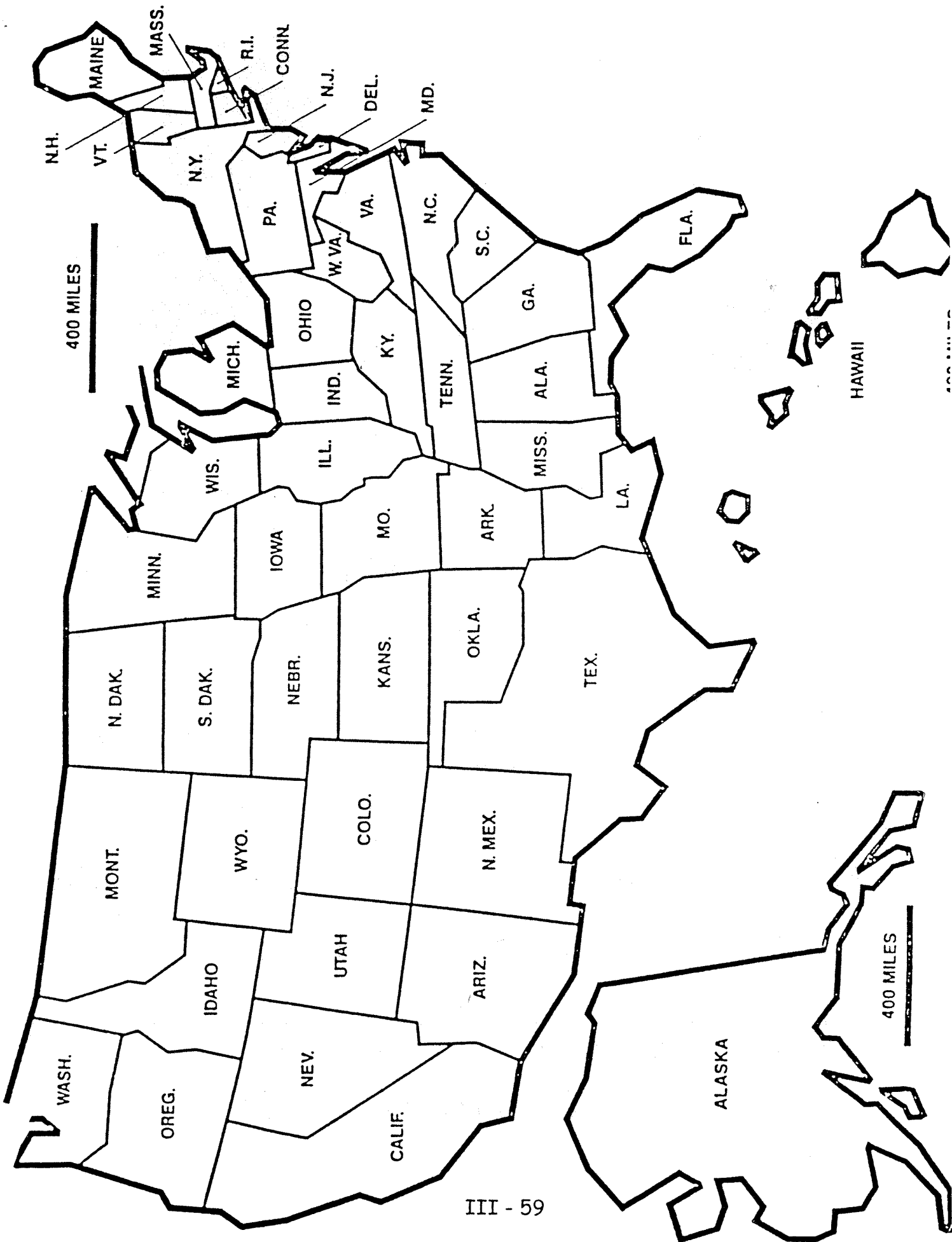


Home

Diapers 3,085
Sheets 249
Pillow cases 1,256
Terry bath towels 690



United States



Texas...Where Cotton is King!

For many years Texas farmers have produced more cotton than any other state in the United States. In fact, in the early part of the 20th century, Texas' economy was so dependent on it that it came to be called King Cotton. A lot of cotton is still grown in Texas, even though we produce a lot of other things on our farms and ranches. However, in Texas we still consider cotton to be king.

After cotton is harvested it is pressed into a bale weighing approximately 480 pounds.

Farmers determine how productive their farm is by how many bales they can harvest, on average, from each acre.

Use the information below to make bar graphs on the next page. Use map colors for your bar graphs. Then answer the questions about King Cotton.

Millions of Acres of Cotton Harvested

1920	13 million
1940	9 million
1960	7 million
1980	7 million
1997	5 million

Millions of Bales of Cotton Harvested

1920	4 million
1940	3 million
1960	4 million
1980	3 million
1997	5 million

1. In what year were the most acres of cotton harvested? _____
2. In what year were the least acres of cotton harvested? _____
3. In what year were the most bales of cotton harvested? _____
4. Using your math skills figure out how many bales were produced per acre. (Hint: Divide number of bales by number of acres harvested.)

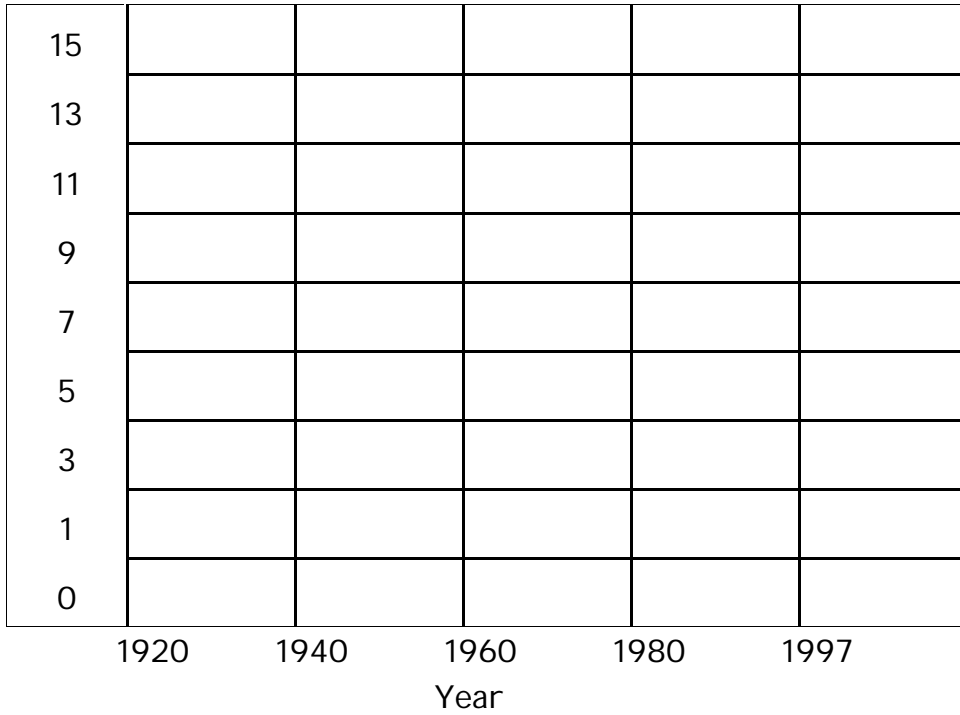
Year	Bales per acre
1920	_____bales
1940	_____bales
1960	_____bales
1980	_____bales
1997	_____bales

5. In what year did farmers produce the most bales per acre? _____
6. Why do you think farmers today are able to produce more cotton on fewer acres than they were able to grow in the past? Use the back of the page for your answer.

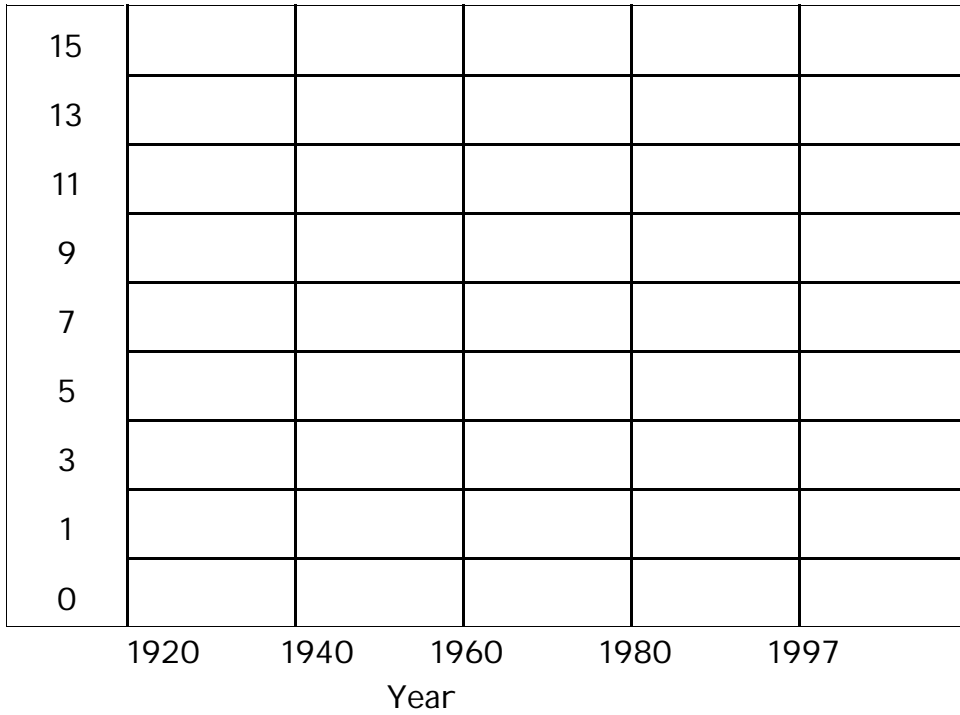
Activity

Texas...Where Cotton is King!

Millions of Acres
Harvested



Millions of Bales
Produced



Cotton —From Field to Fabric



Seedling Cotton Plants



Cotton Bloom



Cotton Boll



Open Boll of Cotton



Harvesting Cotton with a Stripper



Cotton is pressed into Modules



Modules are Stored Until Ready to be Ginned



Modules Waiting to be Ginned



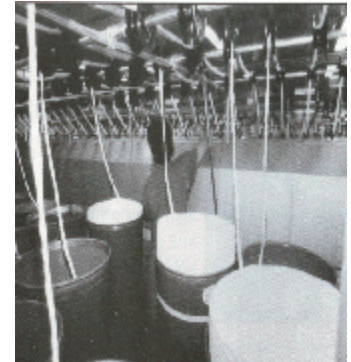
Revolving Circular Saws Pull Lint from Seed in the Ginning Process



Lint is Pressed into 480 Pound Bales



Bales are Wrapped and Delivered to Textile Mill



At Textile Mill Lint is Drawn into Yarn



Looms Weave Yarn into Cloth



Cotton - The Fabric That Touches Us Daily





Countdown to Cotton

Production Steps Scramble

Place the following sentences in the correct order, then use them to complete your "Countdown to Cotton" Booklet.

Cotton is stored in the field in large modules.

At the gin revolving circular saws separate the cotton lint from the seed.

Cotton flower develops into a boll, which opens to form a fluffy lock.

The cloth is made into jeans, shirts, towels and other cotton products we use every day.

The lint is pressed into 480 pound bales.

The bales are delivered to a textile mill where the cotton is cleaned, washed and spun into yarn.

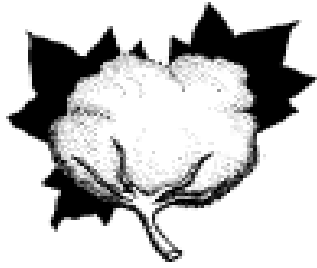
When all the bolls have matured the cotton locks are harvested using a cotton stripper.

Large looms weave the yarn into cloth.

The modules are transported to the cotton gin.



Countdown to Cotton

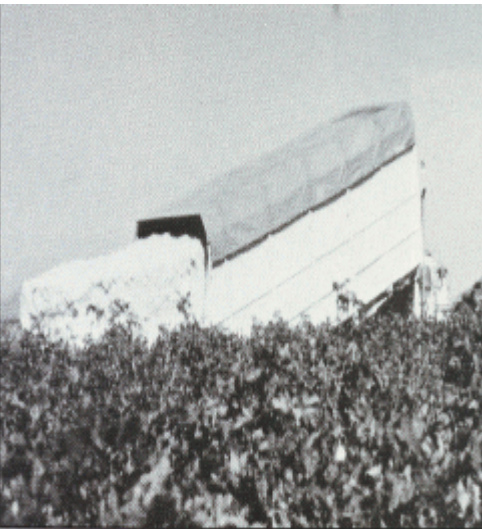


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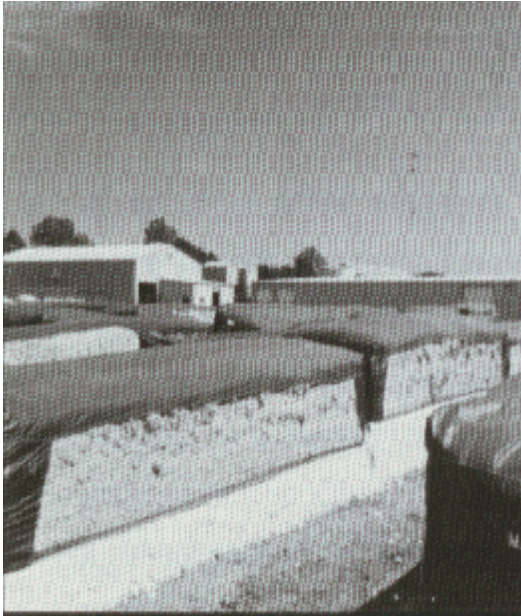








4



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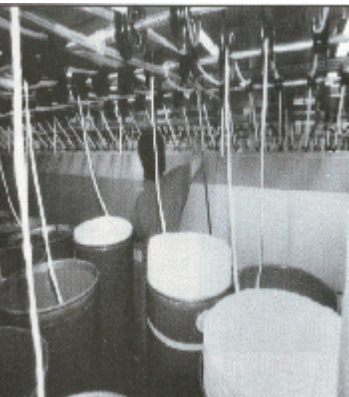


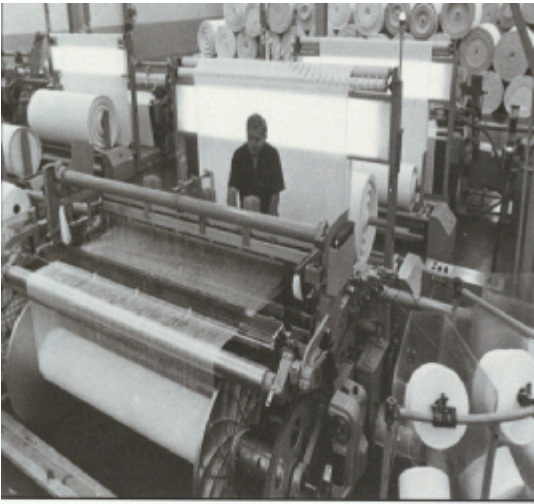
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7











ANSWER KEY

King Cotton

1. 1920
2. 1997
3. 1997
4. 1920 .3 bale per acre
1940 .3 bale per acre (.33)
1960 .6 bale per acre (.57)
1980 .4 bale per acre (.42)
1997 1 bale per acre
5. 1997
6. Farmers are able to produce more cotton on fewer acres because of technology. Farmers use improved varieties of seed, fertilizer, and chemicals to help control weeds and insects, machines to plant, cultivate and harvest instead of hand labor.

Countdown to Cotton Production Steps Summary

1. -3-
2. -5-
3. -1-
4. -9-
5. -6-
6. -7-
7. -2-
8. -8-
9. -4-