AG MAG

An agricultural magazine for kids from Georgia Ag in the Classroom and Georgia Cotton Commission. For more agtivities, visit gfb.ag/AITC and www.georgiacottoncommission.org

COTTON

Cotton is a soft, fluffy fiber that comes from a plant that humans have been using for both food and clothing for thousands of years. 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. Arab merchants brought cotton cloth to Europe about 800 AD. When Columbus discovered America in 1492, he found cotton growing in the Bahama Islands. By 1500, cotton was generally known throughout the world. Cotton was planted in Georgia in 1734, and Georgia was the first colony to produce cotton commercially. Today, there are 17 primary cotton producing states, all located in the southern half of the United States. Georgia ranks in the top 3 states for cotton production.

THE INVENTION THAT CHANGED COTTON PRODUCTION

In the early days of the United States, people separated cotton seeds from cotton fiber by hand. It took one person an average of 10 hours to de-seed one pound of cotton. In 1793, Eli Whitney invented the cotton gin, a hand-cranked machine that enabled one person to separate 50 pounds of cotton in a day. Today, modern cotton gins can process 30,000 pounds of cotton lint in one hour.

WHO WAS ELI WHITNEY?

Eli Whitney was an American inventor who grew up on a small farm in Massachusetts. As a child he had a skill for working with machines and by the time he was an adolescent he was helping area farmers repair their tools and equipment. As an adult he attended Yale College (later Yale University). When he graduated in 1792 he stayed as a guest at Mulberry Grove, a plantation near Savannah, Georgia owned by Catherine Greene, the widow of the Revolutionary War general Nathanael Greene. While there, he met farmers who shared their struggles with growing cotton and the labor required to separate the seeds from the fiber.

Greene and her plantation manager, Phineas Miller, challenged Whitney to find a better way to separate the seed from the cotton lint. In 1793, Whitney's cotton engine (or "gin") consisted of wire teeth set in a wooden drum that, when rotated, separated cotton fibers from the seed. A second, smaller drum revolved at the same time in the opposite direction to sweep the cotton fibers from the wire teeth. Whitney's invention revolutionized the cotton industry and increased production dramatically. Today Whitney is considered the father of mass production.
Source: https://gfb.ag/eliwhitney

THE INSECT THAT CHANGED COTTON

The boll weevil has been the chief pest of cotton since the 1900s. Yield losses because of this insect reduced cotton acreage in Georgia from a high of 5.2 million acres in 1914 to 2.6 million in 1923. The economic devastation of the boll weevil resulted in farmers planting other crops such as peanuts, which was good for overall agriculture production. However, we still needed cotton and if the boll weevil could be controlled, it could be a strong crop again.

As a result of research and funding Georgia growers began participating in a program called the Boll Weevil Eradication Program (BWEP). Over several years, the program was successful and Georgia farmers began planting more cotton.

The BWEP is an ongoing program because the boll weevil can reinfest a field if it is not managed correctly. Cotton scouts check the crop for insect damage and take samples to analyze the type of insects and damage. By knowing the kind, number and location of the insects and their damage within a field, the farmer can make sound decisions about insect management.

HOW DOES THIS FLUFFY COTTON GROW?

In Georgia, farmers plant cotton from April until late June. Seeding is done with mechanical planters which cover as many as 24 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. Machines called cultivators are used to uproot weeds and grass, which compete with the cotton plant for soil nutrients, sunlight and water. Six to eight weeks after planting, flower buds called squares appear on the cotton plants. In about three weeks, the blossoms open. Their flowers change colors from creamy white to yellow to pink and finally to a dark red. After three days, the flower withers and falls off, leaving green pods which are called cotton bolls. Inside the boll, moist fibers grow and push out from the newly formed seeds. The fibers continue to expand under the warm sun and, as the boll ripens, it turns brown. Approximately 16 weeks into the growing season, the boll splits apart and the fluffy cotton fiber bursts forth ready for harvest. The cotton will be mechanically harvested in another four weeks. Throughout the growing season, farmers check for disease and insects, such as the boll weevil. They add fertilizer if necessary and if they have irrigation equipment, they apply water using this method.

THE 5 STAGES:

1. This is called a square and is the flower bud of the cotton plant.
2. When the bud first opens, it is white in color. It is usually pollinated a few hours after it opens.
3. On the second day, the pollinated bloom will become pink in color. On the third day, it is more red.
4. Approximately 5-7 days after the cottom bloom opens, it dries and falls from the plant, leaving the developing boll.
5. As the moist fibers ripen, they expand in the warm sunshine until they split the boll apart and the fluffy cotton bursts out.

Cotton was picked by hand until the mid-20th century. Although the first mechanical picking device was invented in 1850, it was nearly 100 years later before an efficient mechanical picker was invented. The Rust brothers from Mississippi invented a one-row mechanical picker in the early 1930s. Today's cotton pickers can harvest up to eight rows of cotton at a time. In Georgia cotton harvest usually begins in late September or early October.

When the cotton is harvested, it is pressed into large modules, which look like giant loaves of bread, or into large round bales. Specially designed trucks pick up the modules and move them to the gin.

Sometimes called "White Gold," cotton is the most widely grown row crop in Georgia. Today Georgia typically plants more than 1 million acres of cotton per year.

FROM THE FIELD TO THE GIN

Cotton modules or round bales are delivered to the cotton gin for processing. During the ginning process, the seeds and crop residue are removed from the cotton lint using several modern gin stands (modern ginning machines), where circular saws with small, sharp teeth pluck the fiber from the seed.

The cotton is then packaged into bales that weigh approximately 500 pounds. The cotton is then graded by fiber length, strength, and color in a process called classing. After classing, the bales are sold to textile mills or stored in a warehouse to be sold at a later date.

The crop residue, called gin trash, can be sold to livestock farmers as feed or returned to the cotton farmers' fields to be mulched into the soil as nutrients for the next crop.

CHOOSE THE ANSWER!

1.When was cotton first planted in Georgia?
a. 1492; b. 1734; c. 1793; d. 1923

2.What insect almost destroyed the cotton industry?
a. Thrips; b. Boll Weevil; c. Tobacco budworm; d. Stink bug

3.Who invented the cotton gin?
a. Samuel Slater; b. Eli Whitney; c. The Rust Brothers; d. Levi Strauss

4.How many pounds of cotton lint can a modern gin process in 1 hour?
a.15,760; b. 30,000; c. 20,050; d. 19,650

5.How much does a cotton bale weigh?
a. 700 lbs; b. 1,000 lbs; c. 800 lbs; d. 500 lbs

6.The left over crop residue removed from the lint of the gin is called
a. modules; b. linters; c. gin trash; d. bolls

7.What do you call the initial soft, rope-like strands of cotton produced at a textile mill?
a. slivers; b. yarn; c. fabric; d. thread

8.Cotton can be used in the production of which of the following products.
a. rubber; b. mayonnaise; c. explosives; d. all of the above

9.A cotton plant produces pounds of seed for every 100 pounds of lint.
a. 300; b. 250; c. 480; d. 155

10. The most valuable part of the cottonseed is
a. linters; b. cottonseed meal; c. cottonseed oil; d. cottonseed hulls

11.What subject does David Cromley use the most often on the farm?
a. Math; b. Reading; c. Science; d. Social Studies

12.What classes help Jaclyn D. Ford the most at her job?
a.Plant Pathology; b. Accounting; c. Ag. Business; d. Engineering

SEEDS

The seeds of the cotton plants have value, too. Cotton plants produce 155 pounds of seed for every 100 pounds of lint. These seeds are used to make hundreds of different products. After the seeds are removed from the lint at the gin, they are shipped to other manufacturers for cottonseed products.

LINTERS

Linters are short fibers around the seed that are not removed during the ginning process. These fibers are removed by cutting or rubbing the seeds together. They can be used to make medical pads and gauze, twine, candle wicks, mops, carpet yarns, and plastic. They are also commonly used to produce smokeless gunpowder and the “paper” used in U.S. currency.

MEAL

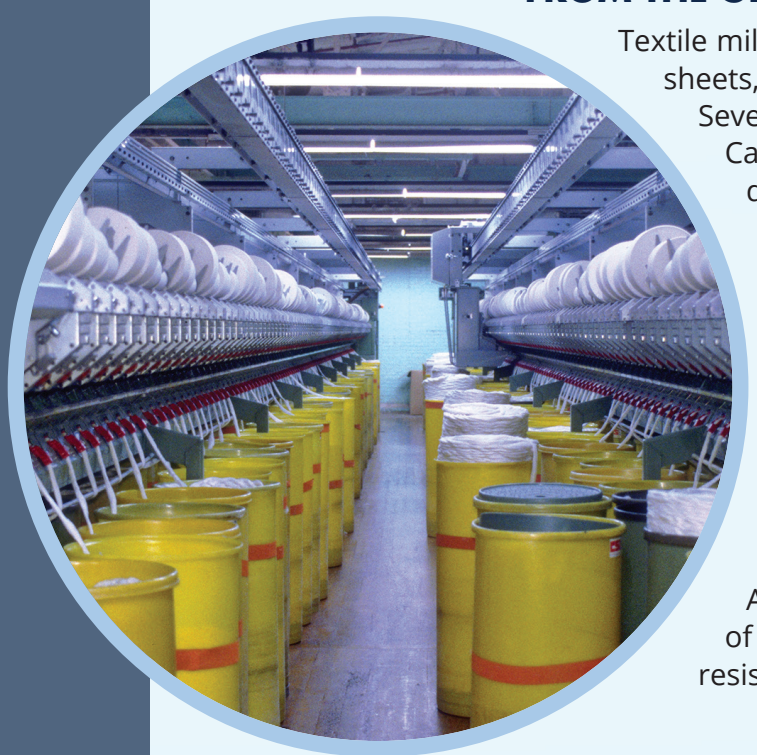
Cottonseed meal is the ground-up kernel, or inside of the seed. It is the second-most valuable part of the cottonseed. Meal is widely used in livestock feeds and as fertilizer for lawns, gardens and flower beds.

COTTONSEED OIL

Cottonseed oil is removed from the kernel by large mechanical presses that squeeze out the oil. The oil is the most valuable part of the cottonseed. Most commonly, it is used as cooking oil and in food products like salad dressing, mayonnaise and margarine. The oil can also be used to make soups, cosmetics, rubber, plastics, explosives, and many other products.

COTTON HULL

The hull is the protective outer coating of the seed. To remove the hull, seeds pass through a series of knives that cut the hull and separate it from the kernel. Cottonseed hulls are used for livestock feed, plastics and the drilling mud that is used in oil and gas wells.



FROM THE GIN TO THE TEXTILE MILL

Textile mills spin the cotton fibers into the threads, which are then woven or knitted into clothing, sheets, towels and other cloth items. Textile mills purchase cotton bales based on their classing. Several bales of the same class are blended together to make a consistent group of fibers. Carding machines process more than 100 pounds of cotton per hour into a funnel-shaped device called a trumpet. The trumpet produces a soft, rope-like strand of cotton known as a sliver (pronounced SLY-ver).

Next is a process called drawing, where the strands of sliver are blended together and twisted into thinner strands. Ring spinning machines draw and twist the cotton until it reaches the thickness needed for weaving or knitting. These smaller strands are called yarns.

Yarns of different sizes are woven or knitted in many ways to create different fabrics. There are three common types of weaving: plain, twill and satin. Machine knitting is very similar to hand knitting, but on a much larger scale. Modern knitting machines use over 2,500 needles and can make over one million stitches a minute.

After the fabrics are dyed with colors or printed with patterns, they enter the final stage of production—finishing. Some of the most popular finishes include pre-shrinking, wrinkle-resistance or water-repellency.

DAVID CROMLEY

Farmer I Nellwood Farms I Brooklet, GA

HOW LONG HAVE YOU BEEN IN COTTON PRODUCTION?

Our family has grown cotton since 1995. I was only seven years old in 1995, but have been helping out around the farm for as long as I can remember. My dad had me packing cotton modules at an early age and running the boll buggy as soon as my legs could reach the tractor clutch. I've been farming full-time since graduating from the University of Georgia (UGA).

TELL US ABOUT YOUR FARM.

Our farm is a family farm; my dad and I work in partnership with my uncle and cousin. We grow cotton, peanuts, and raise beef cattle. Cotton and peanuts are grown from late April to October, with harvest sometimes lasting into December or January. We usually have a three-year crop rotation, with two years of cotton in a field followed by a year of peanuts. This helps promote soil health, as well as planting cover crops and winter grazing for the cattle. The cattle help return nutrients back to the soil through their manure! Soil samples are taken before growing each crop to determine exactly what each field needs to grow successfully. We work closely with the UGA Cooperative Extension Service to choose the best crop varieties and learn best practices to conserve soil, water, and the inputs that we use to grow our crops. We know that the only way we are going to be able to give the next generation a chance to farm is by caring for the land on which we make our living.

WHAT IS INVOLVED IN GROWING COTTON?

The process of growing cotton starts way before any seed actually gets planted in the soil. We begin by looking at which fields will be rotated into cotton and determining which varieties to plant. We use research from variety trials around the state to help us make these decisions. Soil samples are taken early in the year to determine what nutrients are available in the soil and what else is needed to help the crop grow well. After creating a good plan and a budget, in early spring we will begin to terminate cover crops and winter weeds to prepare for the upcoming planting season. Pre-plant fertilizer is spread as close to planting as possible. When the air and the soil warm up enough, and there is sufficient moisture, there is a wild dash to get everything planted as efficiently as possible, while conditions are good. Throughout the summer, the cotton is scouted for insects, weeds, and disease, and spray applications are made if needed to correct these problems. The cotton typically begins to bloom in early July, with white and pink flowers starting to speckle the otherwise green fields. It takes about 25 days from flower to mature boll, so we monitor this critical process closely. By mid-August, the older bolls on the lower part of the plant begin to open on their own, revealing the white fluffy fiber. As the bolls open up higher in the plant, we prepare to defoliate, or remove the leaves, off of the plant to get it ready to pick. After defoliation, the cotton is harvested and sent to the cotton gin in tightly packed modules. After the seeds are separated from the fiber at the gin, the cotton can then be sent to mills, which make the clothes we wear.

WHAT SUBJECTS IN SCHOOL HAVE HELPED YOU THE MOST AS A PRODUCER?

The subject I use most often with my job would definitely be math. Being able to figure out how much seed, fertilizer, water, money, or time is needed to complete a job is extremely critical to being a good farm manager. Having a science background is very helpful as well, understanding how growth processes work. I'm a huge fan of learning and I learn something new every day! You must always be willing to learn, no matter how old you are, if you want to succeed.

WHAT DO YOU LIKE BEST ABOUT BEING A FARMER?

Being able to see and appreciate the beauty of creation every day is probably the most rewarding part of my job. I love watching things grow, and each season of the year brings change for the farmer. No two days are ever the same, and new challenges abound daily (and sometimes hourly) that need solving. I'm also very thankful to be able to raise my family here on the farm, as I hope to instill the values of hard work and integrity into my children the same way my parents did for me. My wife, Jamie, and I have a daughter, Libby, who loves to help me on the farm, and it is a joy to see her learning.

"BEING ABLE TO SEE AND APPRECIATE THE BEAUTY OF CREATION EVERY DAY IS PROBABLY THE MOST REWARDING PART OF MY JOB.

JACLYN D. FORD

Vice-President and Chief Operating Officer I Dixon Gin Co., Inc., I Alapaha, GA

HOW LONG HAVE YOU BEEN IN AGRIBUSSINESS??

My parents began our farm supply business in 1985. After only one year out of college and marrying my husband, I returned home to help run the gin in 2001 when we purchased it. My brothers are also involved in the family business. One (Carl Mathis Dixon) oversees the farm supply and peanut buying point operations. The other (Quentin Dixon) looks after all of our farming operations.

PLEASE EXPLAIN YOUR JOB.

At harvest time in the fall, we drive our trucks to the cotton fields to pick up the cotton, so it can be processed at the gin. Once it arrives at the gin, we weigh each load and put it on our yard to await the ginning process. The ginning process involves removing the seed from the lint. It is basically the same process that Eli Whitney came up with years ago only much more mechanized and technologically advanced. The seed is sold to dairies for feed or oil mills for making cottonseed oil. After the cotton goes through the ginning process, the lint is compressed into a 500 pound bale and then stored in a warehouse to await selling and transportation to a mill (often times in another country) where it is spun into yarn or thread and eventually cloth and finally the clothing we wear. We gin the cotton over about a three month period. After that, we are busy selling and shipping seed and bales.

WHAT IS THE BIGGEST CHALLENGE WITH YOUR JOB?

The cotton market is a futures market (Supply/Demand driven). The market price sometimes makes it difficult to sell the cotton and help the producer get the price he or she needs to make growing it profitable.

WHAT DO YOU LIKE BEST ABOUT YOUR JOB?

I enjoy all the people I get to work with and meet. I get to know local farmers, and I also get to meet people from all over the country (sometimes the world) involved in cotton production.

WHAT SUBJECTS IN SCHOOL HAVE HELPED YOU THE MOST AT YOUR BUSINESS?

My agriculture business classes have definitely come in handy. Like most jobs, a lot of what I do can be learned "on the job". I have a bachelor of science (B.S.) from The University of Georgia. I think college helps to prepare you and exposes you to such a diversity of people. It also shows endurance that we can stick to something and see it through to the end.

"I ENJOY ALL THE PEOPLE I GET TO WORK WITH AND MEET.