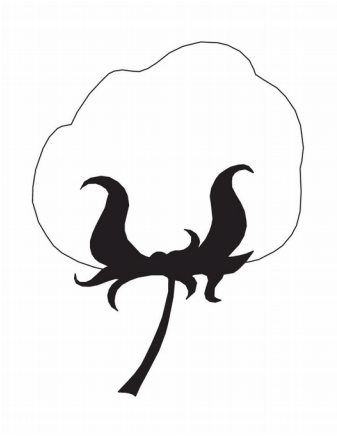
From Dirt to Shirt - The World of Cotton

A lesson from the New Jersey Agricultural Society's
Learning Through Gardening Program



Overview: This lesson is designed to get your students thinking about where the things they wear, use, and eat every day come from. Cotton is a versatile plant. Its fluffy bolls are used to make fabric for clothes, towels, sheet, and much more. Cotton seeds are used for animal feed. They are also used to make cottonseed oil that is part of so many food products we find in the grocery store: potato chips, cookies, mayonnaise, salad dressing, coffee creamers, and ice cream, to name just a few. That paper money you use every day? It's really made of 75% cotton and 25% linen. And every baseball contains 150 yards of cotton. This lesson will show your students the myriad of ways one plant can impact our world and will also walk your students through cotton's long growth cycle.

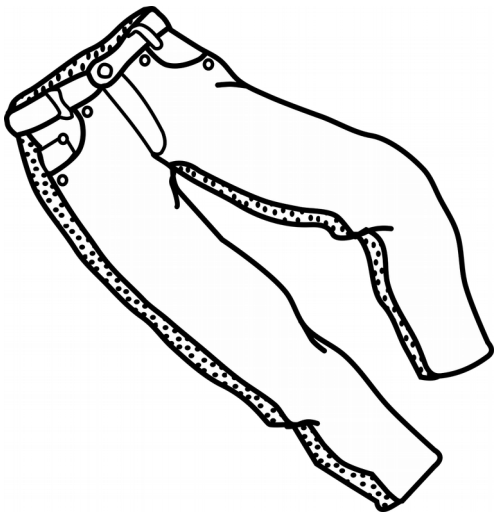
Grades: 2-5 *This lesson can be modified for younger students.*

Objectives: The student will be able to:

- Identify everyday things that are made with cotton fiber or cotton seed.
- Describe the growth cycle of cotton.
- Identify some states where cotton is grown.

Materials, Part 1:
cotton balls
several objects made with cotton, such as: T-shirt, jeans, towel, baseball, dollar bill, salad dressing, potato chips, or other food products
cotton scavenger hunt homework sheet
United States map
"From Dirt To Shirt – The World of Cotton" New Jersey Agricultural Society power point presentation, available to download at www.njagsociety.org, Programs, Learning Through Gardening, Teacher Toolbox.

Materials, Part 2:
cotton bolls containing seeds
cotton seeds
potting soil
containers for planting



Procedure, Part 1

Give each student a cotton ball. Ask what it is and where it comes from. Ask students what they know that is made from cotton. Students will likely talk about different kinds of clothing, but if they don't, the teacher can suggest this. Explain that cotton can be found in other surprising places, including food, sports equipment, and household items. Divide students into small groups. Ask the groups to write a list of items they think are made from cotton. Allow the students to move about the room to find things that are made from cotton.

Then ask the students to:
Name some pieces of clothing made from cotton.
Name a piece of sports equipment uses 150 yards of cotton (a baseball). If possible, show the students the inside of a baseball.
Name an item used in every store is made from cotton ("paper" money).
Name a common household object is made from cotton (q-tips, towels. pillowcases, sheets).
Name the Thomas Edison's invention that originally contained cotton. (lightbulb).
Name an object used to decorate your home that is made from cotton. (curtains, wallpaper).
Name a tape that is made from cotton (duct tape).

For homework, send the students on a home scavenger hunt to check the labels of bottles, boxes, and cans in their kitchen to discover which ones contain cottonseed oil. They can also read the labels on clothing to discover which items are made with cotton. The next day discuss the students findings. Pass around a snack of potato chips, cookies, or other treat that contains cottonseed oil.

Procedure, Part 2

Show students the New Jersey Agricultural Society power point "From Dirt to Shirt - How Cotton Grows." Discuss the slides as you view them and list the steps of the cotton growth cycle. Ask students what climate is needed to grow cotton and where in the United States cotton is grown. Divide students into pairs and hand out U.S. maps. Tell students they can work together to color in the states where cotton is grown.

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

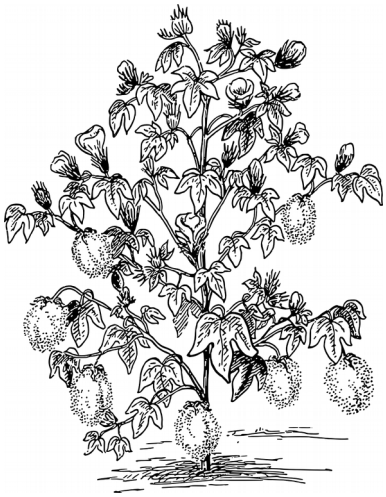
In this country, the 14 major cotton-producing states are: Alabama, Arizona, Arkansas, California, Georgia, Louisiana, Mississippi, Missouri, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas. Some cotton also is produced in Florida, Kansas, and Virginia.

Show students a boll of cotton with the seeds inside. Allow each student to touch the boll to see how difficult it would be to separate the seeds from the boll. Tell students that cotton was difficult to produce in the American colonies because it required many people working for hours to separate the seeds from the bolls by hand. In the late 1700s, a machine called the cotton gin was built to do this hard work.

<u>Background information:</u> *In the late 1700s, Eli Whitney, a native of Massachusetts, got an idea for a machine to separate the cotton seeds from the bolls while watching Georgia plantation workers doing this difficult work by hand. In 10 days, Whitney built a machine that did the work 50 times faster. The machine had spiked teeth on a revolving cylinder that pulled the cotton through small openings to separate the cotton seeds from the fiber. At the same time, a brush removed the fiber from the spikes. Eli Whitney called his invention a "gin" – short for engine – and secured a patent on it in 1793. The cotton gin made it possible to supply large quantities of cotton fiber to the fast-growing industry. Within 10 years, the value of the U.S. cotton crop rose from $150,000 to more than $8 million.*

Show students the cotton seeds that have been separated from the bolls. Explain that in small groups they will be planting the seeds in pots that will be placed on the windowsill.

Important tips for growing cotton indoors:



The cotton seeds should be planted 1/4 inch deep in potting soil in a large pot - about 12" in diameter. You can start with a smaller container, such as a pint milk carton, and work up to a large pot, but the cotton plant must be transplanted into larger containers as it grows to prevent it from becoming root-bound. (When a plant grows for too long in a small container, it can become root-bound. With no room for additional growth, the roots become tangled, matted, and grow in circles.) Make sure that there are holes for water to drain at the bottom of the pot.

Temperature is key to growing cotton indoors. Cotton grows best in soil that is between 65-70 degrees and will not fare well in temperatures below 60 degrees. Place your cotton plant on the sunniest windowsill possible. If the windowsill's temperature drops at night, you might want to move the pot away from the window at the end of the school day. You can use soil from your garden to plant your cotton. Just be sure to bring the soil to room temperature before you plant. Water the cotton plant so the roots are thoroughly wet when the top of the soil feels dry. Touch the soil daily to feel how dry it is and do not let the plant sit dry for days at a time. Cotton plants are heavy feeders, so adding some fertilizer once a month is a good idea.

Cotton seeds should germinate within one to three weeks. Your cotton plant can be transplanted outside in New Jersey in mid-May after the danger of frost has passed. It will take between five and six months for the plant to mature and produce cotton bolls.

Evaluation:

The student can list many different items used everyday that contain parts of the cotton plant.

The student can describe the cotton growing cycle, either through pictures or words.

The student can explain what type of climate is needed to grow cotton and where in the United States cotton is grown.

Extensions:

Read a book about cotton growing and production:

For grades K-2: From T-Shirt to Cotton by Robin Nelson

For grades 3-5: Cotton Then and Now, Fabric-making from Boll to Bolt by Karen Bates Willing and Julie Bates Dock

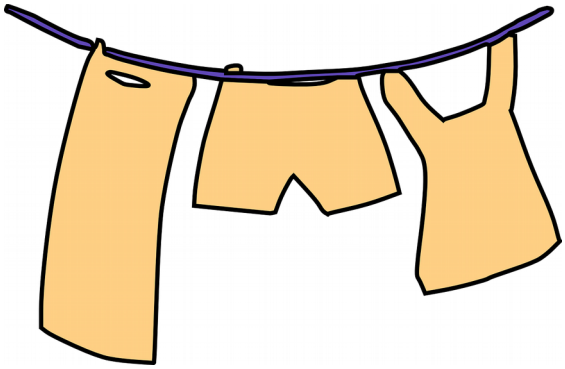
Research and discuss the role of slavery in the cotton production in the South before the invention of the cotton gin.

Research Eli Whitney and the cotton gin invention.

Learn about the steps in cotton fabric production by showing the Youtube video: "Where Does Cotton Come From" found at https://www.youtube.com/watch?v=VkiUnV8qxsI.

Create math problems from the worksheet "What Can You Make From a Bale of Cotton?"

If insects are part of your curriculum, research and discuss the boll weevil.



NAME_____

COTTON SCAVENGER HUNT

Look around your house for items that are made from cotton. Read the labels on boxes, cans, and bottles in your kitchen to see if they contain cottonseed oil. Read the labels on clothes or other cloth items to see which ones are made with cotton. Write the name of things you find that contain cotton on the lines below.

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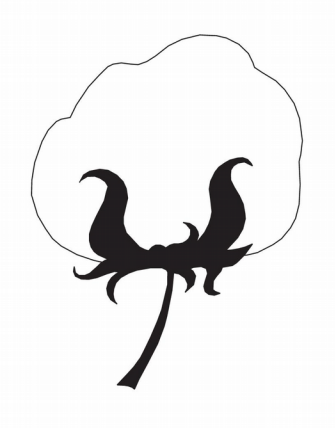

What Can You Make From One Bale Of Cotton?

After cotton is harvested, it is put through a machine called a "cotton gin" (short for engine), which combs the cotton and removes all the seeds. Next the cotton is pressed into huge bales, which are loaded into trucks to be shipped to mills, where the cotton will be made into cloth.

One bale of cotton weighs 500 pounds. Here is a list of what can be made from just one bale of cotton:

215 pairs of jeans	249 bed sheets
690 bath towels	1,217 men's T-Shirts
1.200 pillowcases	765 men's dress shirts
2,104 Boxer Shorts	4,321 mid-calf socks
350 women's dresses	850 women's blouses

<u>And 313,600 $100 bills!</u>