



Cool Cotton Clothing

Suggested Grade Level: K-2

Time: 3 days; 2 45-minute/1-hour sessions, 1 30-minute session.

Subject: Science, English Language Arts

Overview: In this cross-curricular, multi-day lesson, K–2 students explore cotton and its transformation into everyday products through a sequence of hands-on, collaborative activities. Students begin by examining and discussing common cotton-based items, contributing ideas to an anchor chart, and observing cotton bolls to identify plant parts and their functions. Through a read-aloud and class sequencing activity, students analyze and organize the steps in the cotton-to-t-shirt production process. In the second segment, students apply their understanding by dyeing cotton balls and creating a model t-shirt, connecting raw materials to finished products. The lesson concludes with students sharing their models and explaining their learning, reinforcing comprehension through discussion and presentation. Across activities, students develop skills in observation, sequencing, explanation, and representation of informational content.

Objectives:

1. Identify and explain the structure and function of plant parts using observations of cotton bolls and supporting visuals (Science: Life Science).
2. Sequence and describe a multi-step process (cotton to t-shirt) using pictures, words, and oral explanation (ELA: Informational Text; Speaking & Listening).
3. Classify and connect everyday items to their raw material source (cotton) based on observations and discussions (Science/Social Studies: Classification; Goods & Services).
4. Represent understanding through a visual model by creating a cotton-based t-shirt and completing a related worksheet (ELA: Writing; Representation of Knowledge).
5. Communicate understanding of content by participating in discussions and presenting ideas using appropriate vocabulary and complete thoughts (ELA: Speaking & Listening).

Background Information:

Cotton is one of the most important crops grown in the United States. Cotton touches us daily in the clothes we wear, the food we eat, the products we use, and the livestock we feed. Cotton fibers are incorporated into thousands of products that we use each day. The oldest cotton fibers and boll fragments were discovered in Mexico and date back at least 7,000 years. Cotton had to be harvested and processed entirely by

hand for a long time. Producers relied on unethical, unpaid human labor to produce cotton products. However, technological advances have made cotton production more efficient and ethical. In the early 1700s, Samuel Slater built the first American cotton mill to convert cotton fibers into yarn and cloth. Later, in 1793, Eli Whitney developed the cotton gin, which mechanically separated the seeds from the lint fiber (The Story). There are five main cotton varieties worldwide: Egyptian, American Pima, Sea Island, Asiatic, and Upland. Cotton plants are slow-growing and require at least 160 frost-free days, good soil, adequate water, and sunshine. All parts of the harvested cotton are used, from the seeds to the linters and hulls.

Kansas Connections:

Cotton is less prevalent in Kansas than other crops, such as sorghum, wheat, and soybeans, possibly because it is relatively new. Kansas farmers have only relatively recently started growing cotton. Although it was introduced to our state in the 19th century, its popularity rose in the late 1990s. Cotton production has gradually increased since then, with more than 220 active cotton farmers producing 2.4 million cotton bales. Nowadays, Kansas cotton is on the rise – as of 2018, Kansas ranks 15th in total U.S. cotton production (Cotton). Kansas' infrastructure has expanded over time to accommodate cotton production. There are now four cotton gins in Anthony, Cullison, Moscow, and Winfield. Additionally, there are two warehouses in Clearwater and Liberal that store cotton. Cotton is drought-resistant, making it an ideal crop for our state's dry climate. It requires far less water than corn and soybeans. Cotton is also very versatile. Some Kansas farmers also use cotton in their crop rotations, and others use the debris from the fiber for supplemental livestock feed, mulch, or compost (Cotton). Cotton prefers warm, wet weather, so it is typically planted from May 10th to June 6th in Kansas. It is harvested from mid-October to January, depending on the weather of the year (Frequently).

Materials:

Lesson Segment 1: Cotton Products and Growth

- Display a table with items made from cotton (1 item per child)
- "Things Made From Cotton" anchor chart
- Post-It Notes/pencils
- "Cotton" anchor chart and markers
- Cotton Bolls: <https://agclassroomstore.com/cotton-bolls/> (1 per student)
- Magnifying hand lens (1 per student)
- *Journey of a T-Shirt* by John Malam or *From Cotton to T-Shirt* by Robin Nelson
- Cotton Sequence Cards copied onto cardstock

Lesson Segment 2: Dyeing Cotton

- A colorful t-shirt to display
- A handful of cotton balls per student
- 2 Styrofoam bowls per student
- Popsicle stick (1 per student)
- Rubber gloves (1 pair per student)



- A table covered with an old tablecloth
- 1 sturdy paper plate per student
- Things That Come From Cotton Worksheet
- Pencils

Instructional Format:

1. Review background information.
2. Lead class discussions.
3. Complete the activities.
4. Review the vocabulary.

Lesson Segment 1: Cotton Products and Growth

Procedures:

Discussion

1. Set up a display table beforehand with various items that contain cotton. It is best to have one item for each student. Examples: jeans, bandana, shirt, bedsheets, blanket, towel, socks, shorts, candles, frosting, mayonnaise, paint, lipstick, soap, butter, hot pad, dollar bill, candy bar, paper, duct tape, Q-Tip, diaper, gauze, baseball, fingernail polish, cotton balls, rope, gloves, t-shirt, jacket
2. Have students walk around the table and consider what these items have in common. Encourage discussions between classmates.
3. When students return to their desks, start an open classroom discussion about what the items have in common. If they get stuck, you can offer clues:
 - They are all made of or contain the same thing.
 - They are all made of or contain something that starts with the letter C.
 - This thing is a crop that grows in Kansas.
 - This thing is white when harvested in the field.
 - This thing is soft and fluffy.
1. Keep adding clues until the class guesses "cotton."
2. Place an anchor chart at the front of the room that says "Things Made From Cotton." Instruct students to write the name of an item made of cotton on a Post-It note and place it on the anchor chart.
3. Ask the class, "What do you wonder about cotton?" Record their questions on a different anchor chart with "COTTON" in the middle. Keep this chart for reference during the lesson.
4. After your students are done writing, play this short video. *Watch Me: life cycle of a cotton plant | how cotton is produced full video | how to grow cotton:* <https://www.youtube.com/watch?v=8pX1SQTqL8k>. Stop the video at different points to allow your students to name the parts: leaf, closed boll, open boll, flower, lint, seeds, square, and bur.
5. Enlarge **Resource 1** and cover up the names with Post-It notes. Pull off the Post-It notes as the parts are introduced during the video. Discuss 1. the function



of each part and why it is important to the growth of the plant, and 2. why cotton plants grow in the climates that they grow in.

Activity:

1. Hand out one cotton ball and a magnifying lens to each child. Encourage them to point out all the parts of the cotton plant that they can.
2. When they are done investigating, have students leave their bolls on their desks and come down to the carpet. Say, "I wonder how these cotton bolls turn into my t-shirt. Let's read to see if we can find the answer."
3. Read either *Journey of a T-Shirt* by John Malam or *From Cotton to T-Shirt* by Robin Nelson to the class. Then, distribute **Resource 2** for students to match and sequence in a pocket chart as a class, and review the process.
4. Explain to the class, "Tomorrow we will be dyeing our own cotton and making t-shirt models to share." Have students turn to their neighbors and retell the process of how cotton is turned into T-shirts. Use the sentence cards/picture cards in the pocket chart for reference. Note: Students can take the cotton bolls home.

Lesson Segment 2: Dyeing Cotton

Procedures:

Discussion

1. Review the "Cotton" anchor chart from yesterday and add any new knowledge.
2. Review the parts of the cotton plant by referencing the **Resource 1** chart.
3. Watch the video, *JPLovesLIFE: Understanding the Cotton Plant and its Physiology*: https://www.youtube.com/watch?v=_6Y4jPf9W88&t=36s
4. Show the class a colorful t-shirt. Ask the class how the white cotton used to make this shirt is now colored. Students might bring up tie-dyeing or using food coloring. Say, "Let's see if we can dye some cotton ourselves!" Show your students the bag of cotton balls and say, "Why do you think these are called cotton balls? While this is not the exact cotton used to make real t-shirts, let's use them to make our shirt models."

Activity

1. Set up a Styrofoam bowl filled with water for each student on a table covered with an old tablecloth. *Note: Food coloring can stain, so use caution when working with your students.*
2. Have your students put on rubber gloves and choose a food color. Instruct them to put 10 drops of food coloring into the bowl and stir the water with a popsicle stick.
3. Instruct students to add a handful of cotton balls to the water and use the popsicle stick to push the cotton balls down.
4. Leave the cotton balls soaking for about 10 minutes. Have students remove their gloves and leave them by the bowls to put back on later.
5. Return to the tables after 10 minutes and instruct students to put their gloves back on.



6. Have students carefully take out a couple of cotton balls at a time and squeeze the liquid back into the bowl. Then, instruct them to put the squeezed cotton balls into a new bowl. Students will then remove their gloves and leave them on the table with the water bowls. Have your students take their bowls to their desks.
7. Instruct each student to press the cotton balls onto the paper plate in the shape of a t-shirt. They can trade with each other for more color choices. Make sure that they do not get the coloring on their clothes.
8. Leave the plates to dry overnight.
9. Finally, have students fill out the **Resource 3** worksheet.

Lesson Segment 3: Discussion

Discussion

1. Have your students share their t-shirt models and their Resource 3 Worksheets with their peers in small groups. Students can videotape each other explaining their project and discussing what they learned about cotton.
2. Watch the video, The Cotton Board: "Cotton in the Classroom - 2020"
https://www.youtube.com/watch?v=CbNYAD_GUiQ\
3. Have your students whisper to their neighbor: "I like cotton because..."

Vocabulary:

- **Linters:** 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, gauze, twine, candle wicks, mops, carpet yarn, plastic, and dollar bills.
- **Meal:** The ground-up kernel or the 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.
- **Cottonseed oil:** Removed from the kernel by large mechanical presses that squeeze out the oil. This is the more valuable part of the cottonseed, used for cooking oil, mayonnaise, and margarine.
- **Cotton hull:** Protective outer coating of the seed. Used for livestock feed and plastics
- **Lint:** Long fibers that grow on the cotton seeds inside the cotton boll. Used for making cotton fabrics
- **Boll:** the part of a cotton plant that contains the seeds, also called the pod or capsule of a plant
- **Gin:** to separate cotton fiber from seeds and waste material
- **Bale:** cotton that has been pressed into a large bundle

Career Information: Crop Advisor

Crop advisors play a vital role in helping farmers maintain healthy and productive fields throughout the growing season. They regularly scout crops and monitor fields for potential issues such as weeds, insect pests, and plant diseases like boll weevils or boll rot. By identifying problems early, crop advisors can recommend targeted solutions,



including pest control, nutrient management, and irrigation adjustments. Their expert advice enables farmers to make informed decisions that enhance crop yields, minimize losses, and promote sustainable farming practices.

Kansas Standards:

Next Generation Science Standards

From Molecules to Organisms: Structures and Processes

Kindergarten

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive

1st Grade

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

Biological Evolution: Unity and Diversity

2nd Grade

2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats.

Language Arts

Kindergarten

W.K.2 Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic

SL.K.1 Participate in collaborative conversations with diverse partners about Kindergarten topics and texts with peers and adults in small and larger groups

SL.K.5 Add drawings or other visual displays to descriptions as desired to provide additional detail.

RI.K.13 Actively engage in individual or group readings of informational text with purpose and understanding

1st Grade

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and large groups.

2nd Grade

W.2.8 Recall information from experiences or gather information from provided sources to answer a question

SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.

National Ag Literacy Outcomes:

Agriculture and Environment

- Describe how farmers/ranchers use land to grow crops and support livestock (T1 K-2 a.)
- Describe the importance of soil and water in raising crops and livestock (T1 K-2 b.)
- Identify natural resources (T1 K-2 c.)

Plants and Animals For Food, Fiber & Energy

- Explain how farmers/ranchers work with the lifecycle of plants and animals (planting/breeding) to harvest a crop (T2 K-2 a.)
- Identify examples of feed/food products eaten by animals and people (T2 K-2 b.)
- Identify the importance of natural resources (e.g., sun, soil, water, minerals) in farming (T2 K-2 e.)

Food, Health & Lifestyle

- Recognize that agriculture provides our most basic necessities: food, fiber (fabric or clothing), energy, and shelter (T3 K-2 c.)

Science, Technology, Engineering, and Mathematics

- Recognize and identify examples of simple tools and machines used in



agricultural settings (e.g., levers, screws, pulley, wedge, auger, grinder, gears, etc.) (T4 K-2 b.)

Culture, Society, Economy & Geography

- Explain why farming is important to communities (T5 K-2 b.)
- Identify plants and animals grown or raised locally that are used for food, clothing, shelter, and landscapes (T5 K-2 d.)
- Identify the people and careers involved from production to consumption of agricultural products (T5 K-2 e.)
- Trace the sources of agricultural products (plant or animal) used daily (T5 K-2 f)

Companion Resources:

Kansas Ag in the Classroom Kids Connection Cotton Magazine

<https://cdn.agclassroom.org/ks/resource/connection/cotton.pdf>

Cotton Plant Part Labeling Poster: <https://ksagclassroom.org/supporting-resources/>

Cotton Acres: Cotton Education Kit: <https://www.cottonacres.com/product-category/classroom/>

Cotton in the Classroom: <https://www.cottonacres.com/classroom-lessons/>

Cotton Cycle Model: Alabama Ag in the Classroom:

https://www.alabamaaitc.org/wp-content/uploads/2019/03/Cotton_Unit.pdf

Flying Griffin Multimedia: Where Does Cotton Come From?

<https://www.youtube.com/watch?v=VkiUnV8qxsI>

Missouri Farm Bureau: From the Farm Virtual Field Trip: Cotton Farm (Part 1)

<https://www.youtube.com/embed/ZyoDxvcdFkx>

Missouri Farm Bureau: From the Farm Virtual Field Trip: Cotton Farm (Part 2)

<https://www.youtube.com/embed/SiVHA37A3Fs>

Grack, Rachel: Cotton to T-Shirt

<https://www.goodreads.com/book/show/49520923-cotton-to-t-shirt>

Malam, John: Journey of a T-Shirt

https://books.google.com/books/about/Journey_of_a_T_Shirt.html?id=QAvA0t24ojoC

Author: Nancy Smith, first-grade teacher at Heatherstone Elementary and 2019 KFAC Teacher of the Year, KFAC Curriculum Advisory Team; edited by Marissa Cook, Secondary Art Education Major at Kansas State University, KFAC Intern.

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<https://klrd.gov/2023/01/25/cotton-in-kansas/>

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<https://www.kansascotton.com/frequently-asked-questions/>

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Cotton seeds are
planted in the soil
in the spring.

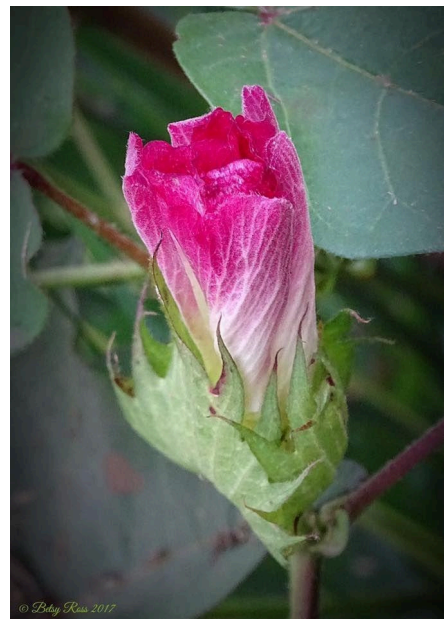


The plant grows
white flowers.



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The white flowers
are pollinated and
turn pink.



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The pink flowers turn into bolls that hold seeds and fluffy white cotton.



The cotton boll breaks open and is ready to be picked.



Large machines pick the cotton from the plants. The cotton goes to a factory.



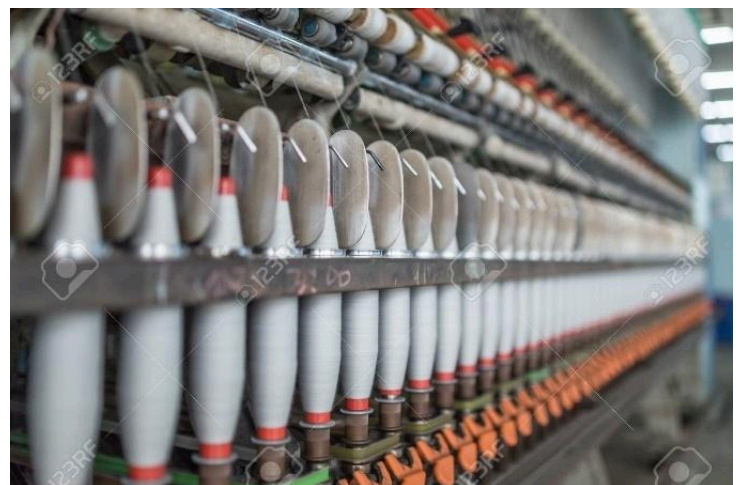
The cotton goes through a gin that separates the seeds from the cotton and cleans it.



The clean cotton is baled and sent to a cotton mill to be made into cloth.



At the mill, machines pull, comb, and spin the cotton into thread.



The thread is fed into a knitting machine, which knits it into cloth.



The cloth is dipped into liquid colors and dyed different colors.



The colorful cloth is wound on a bolt and a truck takes it to the t-shirt factory.



At the t-shirt factory,
machines cut the cloth
into pieces that are sewn
together to make t-shirts.

