

COTTON SCIENCE AND SUSTAINABILITY

Growing Cotton

(Grades 5-8)



Dear Educator,

Welcome to spring! This year, greet the new growth cycle with a fresh approach to your science lessons by teaching about cotton.

When we teach about spring planting, we often think of food crops or flowers. But did you know that cotton is one of the most important crops in the United States? In 2021, 17,500,000 bales of cotton were produced in the United States, and in 2020, the cotton industry was responsible for more than 115,000 jobs.*

In this activity, students in grades 5-8 will learn how cotton grows and explore the environmental factors farmers have to consider throughout the plant's lifecycle. You can use the activity as a stand-alone science lesson, or add it to the other lessons in the **Cotton Science and Sustainability** STEM program available at ymiclassroom.com/cotton, made possible by Cotton Incorporated, the not-for-profit cotton research and promotion company.

In addition, be sure to check out the interactive whiteboard game at the link above for a fun and educational activity you can do with your whole class or in small groups with laptops or tablets. Use it as a preview, a review activity, or even as an informal assessment.

Please feel free to share these materials with other teachers in your school. The materials are copyrighted, but you may make as many copies as necessary to meet your students' needs. Then, please comment online at ymiclassroom.com/feedback-cotton to let us know your thoughts on this program. We depend on your feedback to continue providing free educational programs that make a real difference in students' lives.

Sincerely,
Dr. Dominic Kinsley
Editor in Chief
Young Minds Inspired



Questions? Contact YMI toll-free at 1-800-859-8005 or by e-mail at feedback@ymiclassroom.com.

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Target Audience

Students in grades 5 to 8 and their families

Program Objectives

- Teach students about cotton's value to the environment as a natural fiber
- Help students learn about and evaluate the properties and benefits of cotton
- Explore the versatility of cotton
- Examine the lifecycle of cotton and cotton production

Program Components

- This one-page teacher's guide
- One reproducible activity sheet

More Cotton Science and Sustainability Materials Online

Visit ymiclassroom.com/cotton for:

- Additional activities: *The Fiber Factor*, *Break It Down!*, and *Cotton and the Planet*
- A classroom poster with fun, interesting cotton facts
- *Cotton: From Farm to Fashion to Food*, an interactive whiteboard activity
- An online feedback form at ymiclassroom.com/feedback-cotton
- Common Core and Next Generation Science Standards alignment chart

How to Use This Program

Make copies of the activity sheet for your students, and explore the additional resources online.

Activity

Growing Cotton

Tell students that today they are going to learn about one of the most important crops to the United States economy. Ask them if they can guess what it is. Provide a hint: It's something that is generally used or seen daily, but most people do not grow it in their home gardens. Explain to students that the cotton industry created more than 115,000 jobs* in 2020. And in 2021, 17.5 million bales of cotton were produced in the U.S. While we love our jeans and soft cotton linens, what do we know about the lifecycle of cotton? Where and how is it grown?

Pass out the activity sheet. Explain to students that they will work together to answer these questions and examine the environmental factors cotton

farmers have to manage in order to have successful crops. Have students work individually to complete Part 1. After you review their answers, have them work in teams for Part 2. Because the online article in Part 2 is long, you might suggest that teams divide the article into sections, with each student reading a section and summarizing it for the others. Then, team members should work together to answer the questions.

Answers: Part 1: 1. The seed's shoot may not be able to reach the surface. 2. The taproots are too long for pots. 3. Cotton fibers grow on cottonseeds inside the boll. **Part 2:** 1. They choose hardy varieties, plant when the soil is warm and moist, and make sure they don't plant the seeds any deeper than 2½ inches. 2. Answers will vary, but may include weather, soil temperature, excess moisture, water stress, heat stress, disease, wind, fungus, insects, etc. 3. Answers will vary, but may include monitoring crops for signs of stress, applying irrigation when dry, staying informed about advances in agricultural practices in the area, etc. In some cases, there is little a farmer can do about extreme weather events.

Extension: Add some creative writing STEAM to your STEM curriculum by asking students to create a jingle about cotton, based on what they've learned about its importance and versatility.

Resources

- How a Cotton Plant Grows: <https://sanangelo.tamu.edu/extension/agronomy/agronomy-publications/how-a-cotton-plant-grows/#:~:text=Once%20the%20tiny%20ovules%20that,growing%20longer%20day%20by%20day>
- What Is Cotton: <https://learn.genetics.utah.edu/content/cotton/what>
- The Story of Cotton: <https://www.cotton.org/pubs/cottoncounts/story/index.cfm>
- USDA Crop Production 2021 Summary: https://www.nass.usda.gov/Newsroom/Executive_Briefings/2021/12-09-2021.pdf
- Top 10 Produce Crops in America: <https://agamerica.com/blog/power-of-10-top-10-produce-crops-in-the-u-s/>

*Source: National Cotton Council

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ACTIVITY

Growing Cotton



REPRODUCIBLE MASTER G5-8

When you throw on your favorite jeans, do you wonder how they were made? It starts with a plant and dedicated cotton farmers.

Part 1: Read the passage below and answer the questions.



Did you know that the United States is the world's third largest producer of cotton? And that cotton is both a fiber *and* a food crop? Cotton is an important plant, and like all plants, cotton needs specific environmental conditions to grow well.

Cotton grows best in warm areas, which means that in the United States, most cotton is grown in southern states like Texas. Cottonseeds grow best in firm, warm, and moist soil. In fact, the soil should be at least 60 degrees Fahrenheit before planting, and seeds should be planted 1 to 2½ inches below the surface of the soil.

Once planted, the seeds take about 5 days to sprout. As the cotton plant grows, it develops a long *taproot*. Some taproots can reach lengths of up to 8 feet! Flower buds called *squares* appear about two months later. These blossoms open and then shed their flower petals about a month after that. They leave behind a green fruit called a *boll*, which is shaped like a football. Inside the boll are cottonseeds covered with fibers. As the seeds grow, the fibers grow longer until the boll bursts

open, revealing fluffy cotton ready to be harvested. This usually happens about 105 to 130 days after planting.

Throughout the growth cycle, cotton farmers take special care of the crops to help them grow. From selecting seeds to monitoring soil, weather, and environmental conditions, farmers work to protect the cotton crops and prepare them for harvest.

Once harvested, machines called *cotton gins* separate the cottonseeds from the cotton fibers. The fibers are used to make paper money, yarn for fabrics, and other things. Cottonseeds are used as cow feed and to make cottonseed oil, which is found in some of our favorite foods such as bread, cereal, and snacks. Cotton is a very versatile crop!

1. What do you think might happen if you plant cottonseed too deep in the soil?

2. Why do you think cotton plants do not grow well in pots?

3. On what part of the plant does the cotton fiber grow?

Part 2: While cotton is considered a drought-tolerant plant and is often produced with only rainwater, environmental conditions can influence plant growth, as with any crop. Texas produces the most cotton in the United States. How do farmers there give their cotton plants a good start and protect them throughout the growth cycle?

With your team, visit the Cottonworks website at <https://www.cottonworks.com/en/topics/sourcing-manufacturing/fiber-science/cotton-fiber-development-maturation/?highlight=cotton%20fiber%20development> to learn more about how a cotton plant grows, then answer the questions at right.

1. How do farmers ensure that seeds germinate?

2. What environmental factors can influence plant growth?

3. The article states that plants may shed their squares or flower buds due to conditions including extended cloudy weather, too much nitrogen, low root oxygen because of water-logged soils, hot dry winds, and temperatures below 60°F for several nights." If you were a cotton farmer, what steps could you take to combat one or more of the above issues in order to protect your cotton harvest?
