Lessons for Cotton Campus

Agriculture and Inventions (Grades 6-8)

Cotton has been used around the world for thousands of years—scientists exploring caves in Mexico found scraps of cotton cloth and cotton bolls that were presumed to be around 7,000 years old. Around 3,000 BC, Egyptians were wearing cotton in the Nile River Valley and natives of Pakistan were growing and weaving cotton in the Indus River Valley.

Cotton became an important crop for early settlers in America. By 1607, colonists in Jamestown, Virginia, were growing cotton. The soil and climate of the southern states proved to be an ideal setting for cotton, which is extremely resistant to drought and can mainly thrive through natural rainfall and with limited irrigation.

At first, the raw cotton was picked and spun into thread by hand, and later with the help of a spinning wheel. In 1764, however, the Industrial Revolution in Europe led to the invention of the Spinning Jenny—a hand-powered machine that made it possible to spin more than one ball of yarn simultaneously.
In 1793, an American named Eli Whitney changed the future of agriculture when he applied for a patent for his Cotton Gin. Short for "engine," the gin replaced the work of fifty people. Its purpose was to separate the cotton fibers from the seeds—a time-consuming process formerly performed by hand.

Read the following description of the Cotton Gin from Whitney's original patent, and share with students an image of the gin from the Eli Whitney museum at:
http://en.wikipedia.org/wiki/File:Cotton_gin_EWM_2007.jpg.

"The cotton gin cranked cotton through rollers with teeth made of wire. The wire teeth tore the green seeds from the cotton. Iron slits let the cotton pass through, but not the seeds. A second rotating cylinder of bristles removed the seedless cotton from the wires. Through a simple arrangement of belts, the same crank turned both the cylinder with wires and another smaller one with bristles."

Ask students to speculate on the process Eli Whitney went through to develop his idea for the cotton gin. Pair students up and challenge each pair to make a flowchart of how they think Whitney worked to prepare for his patent. They might suggest, for example, that:

1. Eli Whitney heard his neighbors complaining about how long it took to remove the seeds from the cotton fiber—it took ten hours to remove enough seeds to make one pound of fiber.
2. He imagined a machine in his mind that could do the same work more efficiently.
3. He may have drawn an image of the machine on paper.
4. Whitney tinkered with materials in a workshop as he figured out how to separate the seeds and fiber.
5. Whitney may have built a prototype of the machine.

The Cotton Gin made a tremendous impact on the United States. The textile mills of the north created an increased demand for cotton from the southern states. Production of cotton skyrocketed, expanding from 750,000 bales per year in 1830 to 2.85 million bales in 1850.

Despite this growth, Eli Whitney never made a profit from his invention. Farmers, unwilling to pay the high tax Whitney proposed to charge them for the use of his gins, began making their own imitations. By the time the courts recognized that Whitney had been cheated, it was too late—only one year of his patent remained.

Ask students to consider how other inventions may change the course of history. For example, can they imagine a world in which we can eat cotton? Scientists are working on developing a means by which this could be possible. Share with students the following facts from **www.cottoncampus.org**:

"We can't eat cotton today because it contains gossypol, a compound in cottonseed that is toxic for us. But cotton plants need the toxin in their stems and leaves, where it stops pests from breeding. So scientists needed to find a way to remove it from the seeds, but keep it in the leaves and stems. Recently, scientists at Texas A&M University were able to stop the gossypol from growing in just the seeds. This is very exciting news, since every pound of cotton fiber yields 1.6 pounds of cottonseed. Scientists are still working on this research, but the hope is that one day soon we could eat cottonseed, too!"

Challenge students to write a creative short story or an essay describing how this invention may change the future for the better. How might it affect world hunger, for example? How might it affect the economy of the United States?

Extension activity:
As an additional challenge, encourage students to come up with an invention of their own for how cotton could be used or harvested in an innovative way. Have them draw a diagram of their invention and write a short description of its functionality. Refer students back to the speculative flowchart they made of Eli Whitney's process for designing the cotton gin. Should they go through a similar process in devising their own inventions?