

The Blue Genes Challenge

Name: _____

You made an amazing discovery in your cotton field . . . blue cotton!

- ▶ The blue color is probably due to a natural gene mutation or possibly from a wild strain of cotton.
- ▶ You plant seeds from the blue cotton plants and they produce more blue cotton.
- ▶ You want to know if blue cotton is dominant to white cotton. What should you do?

After crossing a blue cotton plant with a white cotton plant, you find that it produces blue and white streaked cotton. This is a case of _____ dominance.

How could you market this cotton?

- ▶ Run another test cross by crossing two heterozygous plants. B (-) x B (-)
- ▶ What percentage of the offspring produce white cotton?
- ▶ What percentage of the offspring produce blue cotton?
- ▶ What percentage of the offspring produce blue and white striped cotton?

You name your company Blue Genes Incorporated and begin marketing your product. What parent genotypes should you cross to harvest the most blue and white streaked cotton?

Blue Genes Incorporated has become wildly successful and your farm is trying to meet the demand for blue and white streaked cotton. However, you begin to notice a problem in the cotton fields. The blue and white streaked cotton seems to be especially vulnerable to pests. Your plants are being devoured by insects. You have heard of something called Bt cotton and want to know if this could help you with your insect problem.

What are the facts on Bt cotton?

- ▶ Bt cotton was developed to counteract the increasing resistance of insects to pesticides and cost of using them.
- ▶ Bt cotton is genetically modified by inserting genes from soil bacterium *Bacillus thuringiensis* into cotton plant genes.
- ▶ Soil bacterium genes produce protein in plant's tissues that protect plant from pests.

The Blue Genes Challenge *(continued)*

- ▶ Bt is only toxic to insects that have receptor sites where the Bt proteins can bind in their guts. Humans, dogs, rats, fish, frogs, guinea pigs, salamanders, birds, honey bees, lady beetles, and most beneficial insects are not affected by Bt.
- ▶ U.S. Environmental Protection Agency (EPA) tested Bt cotton for toxicity and allergens to humans and many organisms.
- ▶ EPA approved Bt for commercial use in 1995.
- ▶ The advantage of Bt cotton is that fewer plants are lost to insect damage and less pesticide needs to be used.
- ▶ As of 2013, approximately 75% of the cotton planted in the United States is Bt cotton.

What do you think? Could this be a solution for your pest problem in your blue and white streaked cotton crop? Explain. _____
