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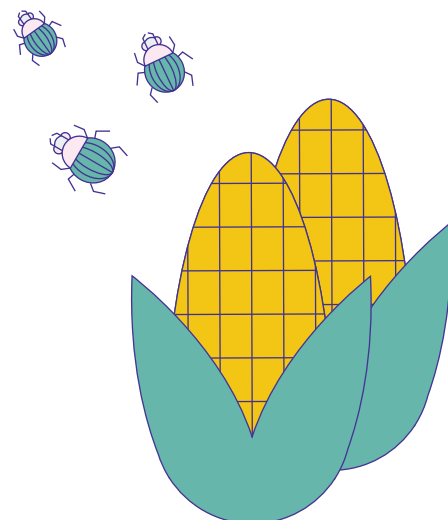
# HOW ARE GMOs MADE?

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“GMO” (genetically modified organism) has become the common term consumers and popular media use to describe foods that have been created through genetic engineering. Genetic engineering is a process that involves:

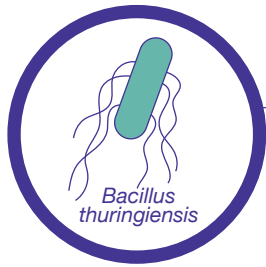
- Identifying the genetic information—or “gene”—that gives an organism (plant, animal, or microorganism) a desired trait
- Copying that information from the organism that has the trait
- Inserting that information into the DNA of another [organism](#)<sup>1</sup>
- Then growing the new organism

The following example gives a general idea of the steps it takes to create a GMO plant. This example uses a type of insect-resistant corn called “Bt corn.” Keep in mind that the processes for creating a GMO plant, animal, or microorganism may be different.



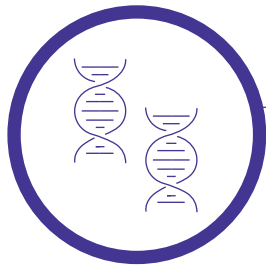
<sup>1</sup> <https://www.fda.gov/food/food-new-plant-varieties/understanding-new-plant-varieties>

# Making a GMO Plant, Step by Step



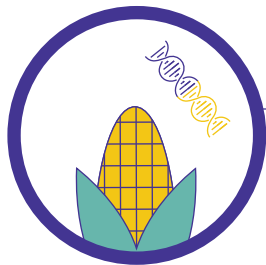
## 01. IDENTIFY

To produce a GMO plant, scientists first identify what trait they want that plant to have, such as resistance to drought, herbicides, or insects. Then, they find an organism (plant, animal, or microorganism) that already has that trait within its genes. In this example, scientists wanted to create insect-resistant corn to reduce the need to spray pesticides. They identified a gene in a soil bacterium called *Bacillus thuringiensis* (Bt),<sup>2</sup> which produces a natural insecticide that has been in use for many years in traditional and organic agriculture.



## 02. COPY

After scientists find the gene with the desired trait, they copy that gene. For Bt corn, they copied the gene in Bt that would provide the insect-resistance trait.



## 03. INSERT

Next, scientists use tools to insert the gene into the DNA of the plant. By inserting the Bt gene into the DNA of the corn plant, scientists gave it the insect-resistance trait. This new trait does not change the other existing traits.



## 04. GROW

In the laboratory, scientists grow the new corn plant to ensure it has adopted the desired trait (insect resistance). If successful, scientists first grow and monitor the new corn plant (now called Bt corn because it contains a gene from *Bacillus thuringiensis*) in greenhouses and then in small field tests before moving it into larger field tests. GMO plants go through in-depth review and safety tests before they are ready to be sold to farmers.

**The entire process of bringing a GMO plant to the marketplace takes several years.**

Get more information about GMOs at  
[www.fda.gov/feedyourmind](http://www.fda.gov/feedyourmind).



<sup>2</sup> [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fsbdev7\\_015300.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev7_015300.pdf)