

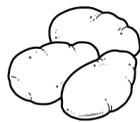
## Biotech Trivia

- Genetically engineered (GE) seed varieties were commercially introduced in 1996.
- The first countries to grow GE crops were Argentina, Australia, Canada, China, Mexico, and the United States.
- In 2018, over 90% of the corn, cotton, and soybean crops grown in the United States were produced using GE varieties.
- In 2020, more than 70 countries from all over the world either planted or imported biotech (GE) crops.
- Most of the GE crops grown in the United States are used for animal food.



## Did You Know ...?

- GE insect-resistant cotton has allowed for a significant reduction in the use of pesticides that may contaminate groundwater and the environment.
- By the 1990's, ringspot virus disease had wiped out nearly all of Hawaii's papaya crop and industry. The rainbow papaya was genetically modified to resist the ringspot virus and saved papaya farming in Hawaii.
- GE potato and apple varieties have been developed to resist bruising that occurs when produce is packaged, stored, transported, or even cut in your kitchen.



## Joke Time

Did you hear about the race between the tomato and the lettuce?



### Joke Answer:

The lettuce was a head and the tomato was trying to ketchup.



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[www.maefonline.com](http://www.maefonline.com)



## Mobile Science Lab ~ Links to Agriculture Using Genetics in Agriculture



### Biotechnology

Simply defined, **biotechnology** is the use of living cells, including their genes and proteins, to solve problems and make products. Genes naturally occur in plants and are transferred from one plant to another through cross-pollination. Through biotechnology, plants are being developed that have genes artificially inserted in them by a scientist.



A **genetic engineer** might place a combination of genes into a plant to make it more useful or productive. A scientist might try to create a plant that produces more fruit, or that is resistant to pests. Some scientists work to make plants more tolerant to heat, cold or drought. This work is often a long and difficult process which takes patience and persistence. All foods that are genetically modified are put through the same safety and approval processes by the FDA as traditionally bred plants. Only those deemed as safe and nutritious as traditional plants are approved to be grown and eaten.

### Tomatoes

Tomatoes are one of the world's most popular vegetables and they contain a special nutrient called *lycopene* which may reduce the risk of cancer and heart disease. Because of the health benefits of lycopene, scientists are now looking for ways to increase the lycopene in tomatoes. Scientists have also looked for ways to slow the ripening of tomatoes to improve flavor.



### Rice

Millions of people in the world do not have access to a variety of foods and eat rice as the main part of their diet. Many of these people suffer from Vitamin A deficiency which can affect vision and cause other medical problems. Scientists have discovered ways to modify rice seeds in order to produce a rice that contains more nutrients. This discovery may help to protect many people from malnutrition and disease.

### Coffee and Tea

Scientists are working to produce coffee beans and tea leaves that will provide naturally decaffeinated products that still have the same taste as caffeinated coffee and tea. A scientist in Hawaii is developing a method for making all coffee beans ripen at once so that harvesters can pick all the beans at the same time. This would save time and money for the farmer.



### What Does the Future Hold?

Scientists will continue to work hard to develop foods that are healthy for you and can be shipped without spoiling. They will also look for ways to adapt plants so they can grow in new environments. Scientists will try to reduce the need for pesticides by discovering ways to make plants insect resistant. What will happen in the future? We will have to wait and see.

## How Well Did You Read?



1. What was the author's purpose for writing this article?

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2. Why does genetic engineering take patience and persistence?

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3. List three reasons why a scientist might try to modify the genes of a plant.

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4. If you were a genetic engineer, what plant would you like to modify?  
Give details explaining your choice.

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## Careers in Biotechnology

from "In-Demand Biotechnology Jobs Shaping Our Future"  
S. Joubert, 2018



**Biochemists** study the chemical properties of living things and biological processes, such as cell development, cell growth, heredity, and disease.

**Medical scientists** conduct clinical research to improve patient health by investigating diseases and prevention methods. They may also develop and test medical devices.

**Biological Technicians**, also known as medical laboratory scientists, collect samples, perform tests, and analyze results of body fluids, tissue, bacteria cultures, and other substances. These technicians use lab instruments, advanced robotics, specialized computer software, and automated equipment to collect, analyze, and model experimental data.

**Microbiologists** study viruses, bacteria, and the immune system to produce biomedical and industrial products.

**Biomanufacturing Specialists** use tools and methods to guarantee products meet stringent requirements of purity, safety, and quality throughout the manufacturing process.

Is biotechnology a good fit for you?

Circle one or more of the jobs above that sound interesting to you.

## Just for Fun



Genetic Engineering is changing the structure of DNA molecule.  
by replacing the original genes with new ones from another  
DNA molecule. DNA is a complex chemical that makes up a gene.



DNA stands for *DEOXYRIBONUCLEIC ACID*.

See how many words you can make using the letters in:

**D E O X Y R I B O N U C L E I C A C I D**