**Genetically Modified Organisms- The Good, The Bad, and The Ugly**

Modified from: <http://encyclopedia.kids.net.au/page/gm/GMO>

*Instructions: Read the following article about GMO’s. As you read, CIRCLE any thing that supports GMO’s and UNDERLINE anything that opposes GMO’s.*

**What is a Genetically Modified Organism?** A genetically modified organism (or GMO) is any organism in which the DNA has been changed in a way that does not occur naturally by mating or natural selection. For instance, a pepper may have DNA from a fish added by scientists to make it more tolerant to frost. Both the terms GE (Genetically Engineered) and GMO (Genetically Modified Organism) are commonly used to refer to all organisms that have added genes from another species which were inserted through the techniques of genetic engineering.

**The Controversy-** Genetic Modification is the subject of controversy in its own right - some believe that the science itself should be forbidden. Genetic modification within [agriculture](http://encyclopedia.kids.net.au/page/ag/Agriculture) is an issue of some [strong debate](http://encyclopedia.kids.net.au/page/tr/Trade_war_over_genetically_modified_food) in the [United States](http://encyclopedia.kids.net.au/page/un/United_States), the [European Union](http://encyclopedia.kids.net.au/page/eu/European_Union), and some other countries.

 People who support genetic modification argue that it allows great advances in agriculture (for instance, making plants more resistant to certain diseases or water shortages, increasing their nutrient value, or lowering their cost of production), as well as allowing other beneficial creations such as the petroleum-eating bacteria. People who support GMO’s usually dismiss published concerns as bad science and alarmism. They say that genetic modification offers enormous benefits in terms of improved agricultural efficiency and the good health effects of better nutrition.

People who oppose GMO’s generally argue that the ultimate results of releasing genetically modified organisms are not predictable and may have unexpected and irreversible effects on the environment. People can own the rights to sell GMO’s under some laws (such as the U.S. law) which means that GMO crops can possibly hurt agriculture business by leaving independent farmers unable to purchase seed each year. Opponents also say that many of these issues have not been studied enough and warn that mistaken assumptions about safety could result in disaster. They also fear that natural species could disappear resulting in loss of beneficial traits.

**GMO’s today-**The practice of genetic modification, as a scientific technique, is unrestricted in the United States; individual GMO crops are subject to intense study before being brought to market and are common in the United States. Many countries in [Europe](http://encyclopedia.kids.net.au/page/eu/Europe) have taken the opposite position: that genetic modification has not been proven safe, and therefore that they will not accept [genetically modified food](http://encyclopedia.kids.net.au/page/ge/Genetically_modified_food) from the United States or any other country. This issue has already gone before the [World Trade Organization](http://encyclopedia.kids.net.au/page/wo/World_Trade_Organization), which determined that not allowing GMO food into the country created an unnecessary obstacle to international trade. Not all genetic modifications have the same effects on health or on the environment, so the policies that classify all genetic modifications as good or bad are not very accurate. However, waiting to make policy decisions may not be in the public interest.

The standard agricultural practice of applying certain (but not all) pesticides to crop plants has been shown to result in short- and long-term harmful effects in humans. There is therefore some question as to whether genetically-modified crops that confer pest resistance might be harmful to humans or not.

**Environmental Impact-**There is already some strong evidence that the cultivation of a genetically modified plant may lead to environmental changes. However, whether a genetically modified plant can itself harm the environment is a matter of controversy among scientists. For example, making too many insecticides leads to resistance of insecticide in insects (Natural Selection!). This will make pesticides less helpful when applied to non-GMO crops.

Another impact is noticed upon the use of GM plants resistant to herbicides. For example, the use of Round-up has tripled in 3 years with the increasing area cultivated with GM-roundup-resistant soybeans. Roundup is a total herbicide, whose toxicity has several times been questioned. Some ingredients of Roundup are responsible for acute toxicity to humans such as eye irritation. Ingestion of Roundup has been proven to cause [diarrhea](http://encyclopedia.kids.net.au/page/di/Diarrhea) in very high exposures. In California, Roundup has been identified as the third most commonly reported cause of pesticide-related illness amongst farmers exposed to bulk quantities, generally as eye irritation.

## Foods that are GM-

-soy (94%), cotton (90%), canola (90%), sugar beets (95%), corn (88%), Hawaiian papaya (more than 50%), zucchini and yellow squash (over 24,000 acres)

-Products derived from the above, including oils from all four, soy protein, soy lecithin, cornstarch, corn syrup and high fructose corn syrup

-Approximately 90% of all products on supermarket shelves contain GMO ingredients

*Look back at the underlined and circled notes you took while you read. Now make a list of Pro’s (Good things) and Con’s (Bad things) about GMO’s. Your list should have AT LEAST 6 arguments for each side.*

1. Pro’s of GMO’s
2. Con’s of GMO’s