Chapter Background

Whose Life Is This, Anyway?
Whether it's a fast-growing fish species or a new crop of corn, the questions surrounding genetic engineering boil down to some common elements. Should genetic engineering be pursued? Does genetic engineering enhance or endanger the safety of the food supply? Will genetic engineering contribute to meeting future needs for food and nutritional improvements in diets? Could genetic engineering affect species or habitats? Is genetic engineering moral—the right thing to do?

Food Safety Questions
When people encounter a new red-ripe tomato or cream-colored cauliflower at the grocery store, they usually don't go too much beyond tossing one into the cart and moving on to the cereal aisle. Genetic engineering, however, has led some people to think twice. What effects, they wonder, might the inserted genes have on them?

Some people develop allergic reactions to certain foods, such as shellfish and peanuts. These allergic reactions, in severe circumstances, can kill. Proteins that are taken from commonly allergenic foods are presumed to be allergens unless tests indicate otherwise. These foods must be labeled. Proteins taken from foods that are not commonly allergenic must also be evaluated. If these proteins have the characteristics of allergens, they too must be labeled unless tests indicate that they do not cause allergic reactions. Recently, a large company stopped developing a genetically engineered soybean that contained a protein from Brazil nuts because research showed that the new soybean triggered the same allergic reactions that the Brazil nut did. And what about foods which may have unknown allergens? Are the FDA guidelines sufficient to ensure that allergens are not unintentionally introduced into our food supply?

Should Genetically Engineered Foods Be Labeled?
The FDA, USDA, EPA, and state agencies monitor the development and testing of genetically engineered products. The FDA does not require genetically engineered food products to be labeled as such solely because they are made using recombinant DNA techniques. The FDA has decided that "many of the food crops currently being developed with gene splicing techniques do not contain substances that are significantly different from substances already in the diet, and thus would not require approval as a food additive." Labeling commodity grains would add significant costs to grain storage, shipment and processing in segregated lots. However, foods containing a protein that companies identify as allergenic or are engineered to have a major ingredient not normally present would have to be labeled under current regulations.

Some marketers have voluntarily identified food products such as tomatoes as genetically engineered. Some have identified products such as milk as not being produced using genetic engineering. When asked, the vast majority of consumers seemed to favor food labeling. For example, a July 1995 survey of New Jersey residents found that 84 percent favored mandatory labeling of engineered fruits and vegetables. This preference for labeling, however, seems to come more from the consumer's desire to make an informed buying decision than the desire to avoid genetically engineered food.
Fields of Grain
What impacts does genetic engineering have on the environment? Some say that genetic engineering is helping the environment. If the initial increase in yields can be maintained, farmers in other countries with rapidly growing populations will have to disturb less land, and more habitat will be left as forests, wetlands, and grasslands. Crops that have been engineered to be insect-resistant have already led to a reduction in the use of pesticides, reducing the potential for water pollution and the use of resources needed to manufacture, distribute and apply pesticides. The laws of supply and demand predict that the more food we produce and the more efficient we are at producing it, the lower the long-term cost will be to consumers. In the U.S. as yields have doubled over the past 40 years the cost of food has declined by half and millions of acres of farmland have been restored to wetlands or other natural habitat.

Others claim that most pressure to convert forests, wetlands, and grasslands to agriculture has little if anything to do with crop yields. For instance, when people don’t have money to buy food, they move onto lands where they can grow their own food. Increasing yields on lands already farmed won’t give poor people without land any more money or any more food, and won’t stop them from growing their own food wherever they can. Critics also charge that diseases and insects may overcome the genetically-engineered crops’ resistance to them and become more troublesome than ever, requiring the use of more chemicals not less. They say that crops engineered to tolerate herbicides serve to maintain farmers’ reliance on chemical weed control, and in some cases, result in increased use of herbicides — not less.

Religious and Ethical Issues
People also may be opposed to genetic engineering because of religious or ethical beliefs. Some believe that life forms should not be changed by humans. Others point out that changes resulting from traditional plant breeding are so great that many foods we eat today bear little resemblance to the wild species from which they were bred.

Still others worry about eating “forbidden” foods. Some vegetarians, for example, argue that their diets may be violated by inserting an animal gene into a plant. Others express concern that a genetically engineered food may, without their knowledge, contain a gene from a food forbidden in their culture.

These are difficult questions, since the DNA and genes of all species share the same genetic code and many common proteins with only minor differences.

Who Benefits?
Who ultimately benefits from genetically engineered foods, medicines, and other products? Some say that the research community and the businesses that make the products will realize

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all the benefits. They believe there really won't be benefits. In fact, there may be risks to the environment or consumers.

However, others believe developments today show promise of improving the variety, availability, healthfulness, and taste of food choices with products such as delayed-ripening tomatoes and higher-starch potatoes for making lower-fat fries. They point out that other advances are already improving crop yields and reducing the total costs of growing the crop. They also note that genetically engineered squash, rice, and other crops that resist pests show promise of providing reliable harvests in developing countries.

**Your Role as a Leader**

This chapter helps youth start to analyze issues and ethical concerns related to genetic engineering. Your role is to help youth investigate issues and then form sound opinions. In order to face the ever-changing world, youth need to be able to think intelligently for themselves.