

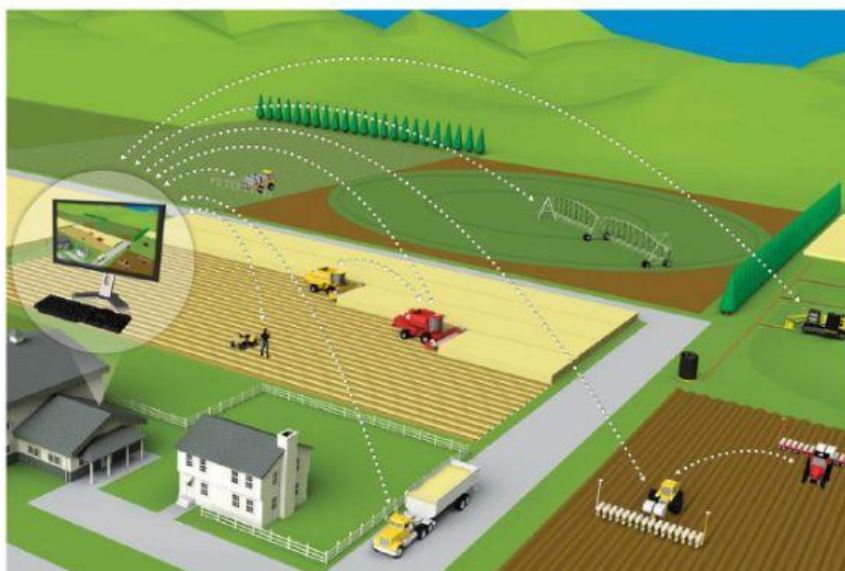
Reading 3

Skills:

- Identify sequence
- Select summary information

Getting started: What are some things that you know can be genetically modified?

FARMS OF TOMORROW AND GENETICALLY MODIFIED CROPS



1. Read the first part. Choose the sentence that summarizes each paragraph (1-4).

- A. Positioning systems can be used to direct machines and save time and labor. ____
- B. To provide enough food for the future generations, food will have to be modified.
- C. Technology can be implemented so that farms can be more effective in order to provide food to different people. ____
- D. Big farms will have to be automated so that they can be more competitive.

How can technology help farmers deal with increasing demand?

With more and more mouths to feed, farms need to be run as efficiently as possible in order to keep up with demand. As a result, many farmers are turning to new technologies for help, using precision systems to make many of their day-to-day tasks easier.

For example, GPS is already widely used to ensure tractors are driven in straight lines across fields, preventing them from overlapping their routes. This helps to save fuel, fertilizer and seeds that would otherwise be wasted as the farmer covers the same piece of land again and again. However, in the not-so-distant future, farmers may not need to drive their tractors at all, with several self-driving machines currently in development.

Other farming machinery is also becoming increasingly hi-tech, with robots being used to feed and milk livestock more efficiently. Although some of this modern technology is unaffordable for many farmers at the moment, the farms of the future are likely to be incredibly large-scale businesses, which need to be almost entirely automated in order to be cost-effective. So instead of cleaning the pigs and feeding the cows, future farmers will be able to sit back and let the machines do all the hard work, while they control everything from their smartphone or tablet.

Growing enough food for the rapidly growing population of a planet with a changing climate would be more or less impossible without genetic engineering. By modifying the genes of plants, new crops that are resistant to weed-killing herbicides and disease-causing pests can be created, and they will also be able to grow in inhospitable conditions. These genetically modified organisms (GMOs) can also be created to produce fruit and vegetables that stay ripe for longer, reducing wastage, or even contain more of the vitamins we need to stay healthy. Although there is some controversy surrounding GMOs, there is currently no evidence that they are bad for your health as people and livestock have been consuming them for decades with no ill effects.

2. Read the second part. Organize the steps in order. Write 1-7 in each gap. Take into account the sequences of each step to identify the order of the process.

How to genetically modify a plant - The simple steps for creating a modified food crop

1. Extract DNA

DNA with the desired characteristic, such as herbicide resistance, is extracted from its host organism, such as a species of bacteria.

____ Method two

The gen is inserted into a bacterium called an agrobacterium, which smuggles it into the plant cell.

____ Plant breeding

The new genetically modified plant can be bred to create a new crop that passes the gene to new generations.

____ Method one

Gene guns use a high-pressure gas to fire metal particles covered with the gene into the plant cell.

____ Isolate the gene

The specific gene is then isolated and can be cloned to make additional copies for modifying more plant cells.

____ Transfer the gene

The gene is then inserted into the plant cell using one of two methods, a gene gun or an agrobacterium.

____ Creating young plants

The modified cells are grown in the lab so that they regenerate into young plants.

**Adapted from How it Works – World of Tomorrow. Fifth Edition. DK Publishing.*

What do you think?

Do you think genetic manipulation of organisms is unethical?