



## Agricultural Biotechnology Assignment

Travel to this site:

<http://cls.casa.colostate.edu/TransgenicCrops/animation.html>

You might need to download the program which will play the animation. Mouse over and click on the various stages of producing plant transgenic crops. The questions begin with the modules AFTER the overview.

### 2) DNA and DNA Extraction

- What do the yellow and green blocks represent in the DNA molecule?
- How many genes are found on a single chromosome?

### 3) Cloning Genes

- What color is the single gene of interest?
- What did the scissors represent?
- The restriction enzymes were used twice. Why?
- After the recombinant plasmids are formed, what is added to the test tube?
- What is the process of using quick pulses of electricity to create small holes in the bacterium?
- The bacteria are plated on media containing what?
- Why will some of the bacteria die?
- What is a gene library?

### 4) Gene Modification

- What are the three regions defined by the gene?
- What two things does the promoter code?
- What are three nucleotides called?
- The chart shows how many promoter types? How many coding regions?
- Did the corn borer make you giggle? 😊

### 5) Transformation and Tissue Culture

- What is the goal of transformation?
- What is placed on the gold particles?
- Events of gene insertion are determined by \_\_\_ and \_\_\_.
- The gene is now part of the cell's DNA and will be passed on to \_\_\_.

### 6) Backcross Breeding

- How do the lines of plant that survive transformation and tissue culture differ from elite lines?
- The pollen from the tassels traveling to the silks of the same corn plant is called \_\_\_-pollination.
- Seed from the homozygous transgenic plant is planted near to the \_\_\_ plant.
- What type of pollination occurs?
- The F1 plant is mated "back" to the elite inbred. What is this process called?
- How many generations does it take to get plants that have at least 98% elite genes?

Now, travel to this site.

<http://www.pbs.org/wgbh/harvest/engineer/transgen.html>

- 7) What does BT represent?
- 8) What do the toxins do?
- 9) In step one, what color is the gene from the DNA of Bt?
- 10) In step two, what is the genus of the bacterium?
- 11) In step three, what is the color of the bacterial growth media?
- 12) In step 4, the vector's DNA includes the \_\_\_ and \_\_\_ genes and becomes integrated with the plant cells' \_\_\_.
- 13) In step 6, you exposed the plant cells to what?
- 14) Why did the caterpillar not survive?

Now, travel to this site.

<http://www.koshlandscience.org/exhibitdna/crops01.jsp>

#### Improving Crops

- 15) What was the ancestor crop to corn called?
- 16) Matching today's corn production with teosinte would require what percent of the land area of the lower 48 states?
- 17) On the fourth section, after reading the introduction, click on "Start activity."  
Make a table after choosing five of the chromosomes. For each chromosome, list a particular gene mutation found on that chromosome. Be sure to match the chromosome with the mutation.
- 18) Define a GMO.
- 19) Complete the sentence in italics written at this web site.  
"both transgenic and conventional approaches to adding genetic variation to crops..."

Finally, travel to this site. It is a podcast. Listen to the podcast and take notes.

[www.scienceandsociety.net/podcasts](http://www.scienceandsociety.net/podcasts)

Travel to the date of February 1, 2007 and travel about ½ way (or ¾) down the page. Click on the button to hear an interview with Dr. Michael Fernandez, Executive Director of the Pew Initiative on Food and Biotechnology.