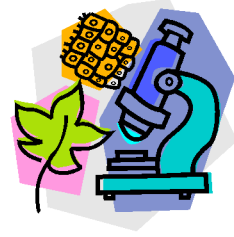


**Roland-Story Biology Class**  
**Chapter 11 Study Guide**  
**Gene Technology**



Name \_\_\_\_\_

**Section: Genetic Engineering**

**Complete each statement by underlining the correct term or phrase in the brackets.**

1. Cohen and Boyer revolutionized genetics by producing recombinant [DNA / RNA].
2. In Cohen and Boyer's 1973 experiment, genetically engineered [bacterial / human] cells produced frog rRNA.
3. Moving genes from one organism to another is called [genetic / chemical] engineering.
4. [Restriction / Selection] enzymes recognize specific short sequences of DNA, then cut the DNA at specific sites within the sequences.
5. Circular DNA molecules that can replicate independently are called [plasmids / clones].
6. An enzyme called DNA [ligase / helicase] is used to help bond DNA fragments together.
7. In a genetic engineering experiment, making copies of a gene each time a host cell reproduces is called gene [cloning / reproduction].
8. Restriction enzyme cuts produce pieces of DNA with short single strands on each end that are called [sticky / recombinant] ends.

**Study the following steps in a genetic engineering experiment. Determine the order in which the steps take place. Write the number of each step in the space provided.**

- \_\_\_\_\_ 9. The recombined vectors are returned to the host cell. The host cell reproduces.
- \_\_\_\_\_ 10. DNA from the organism containing the gene of interest and the DNA from the vector are cut into pieces using restriction enzymes.
- \_\_\_\_\_ 11. Cells that have received the gene of interest are identified.
- \_\_\_\_\_ 12. The DNA fragments from the organism and the vector are combined using DNA ligase.

**Complete each statement by writing the correct term or phrase in the space provided.**

13. In a Southern blot, the DNA from each bacterial colony is isolated and cut into fragments by \_\_\_\_\_.
14. Gel \_\_\_\_\_ separates DNA fragments by their charge and size.
15. DNA fragments are \_\_\_\_\_ charged.
16. The larger a DNA fragment becomes, the \_\_\_\_\_ distance it travels in a gel.
17. After the DNA bands are separated, they are transferred to a piece of filter paper, which is moistened with a(n) \_\_\_\_\_ solution.

### **Section: Human Applications of Genetic Engineering**

**Complete each statement by underlining the correct term or phrase in the brackets.**

1. The research effort to determine the nucleotide sequence of the entire human genome and to map the location of every gene on each chromosome is called [the Human Genome Project / Project 2003].
2. Humans have about [30,000 / 120,000] genes.
3. Humans have about [3 billion / 2 trillion] base-pairs in all their DNA.

**Complete each statement by writing the correct term or phrase in the space provided.**

4. The protein \_\_\_\_\_ is produced by genetic engineering to treat diabetes, and the protein factor VIII is produced to treat \_\_\_\_\_.
5. A(n) \_\_\_\_\_ is a solution containing a modified or killed version of a pathogen.
6. When a vaccine is injected, the immune system recognizes the pathogen's surface \_\_\_\_\_ and responds by making defensive proteins called \_\_\_\_\_.



## Section: Genetic Engineering in Agriculture

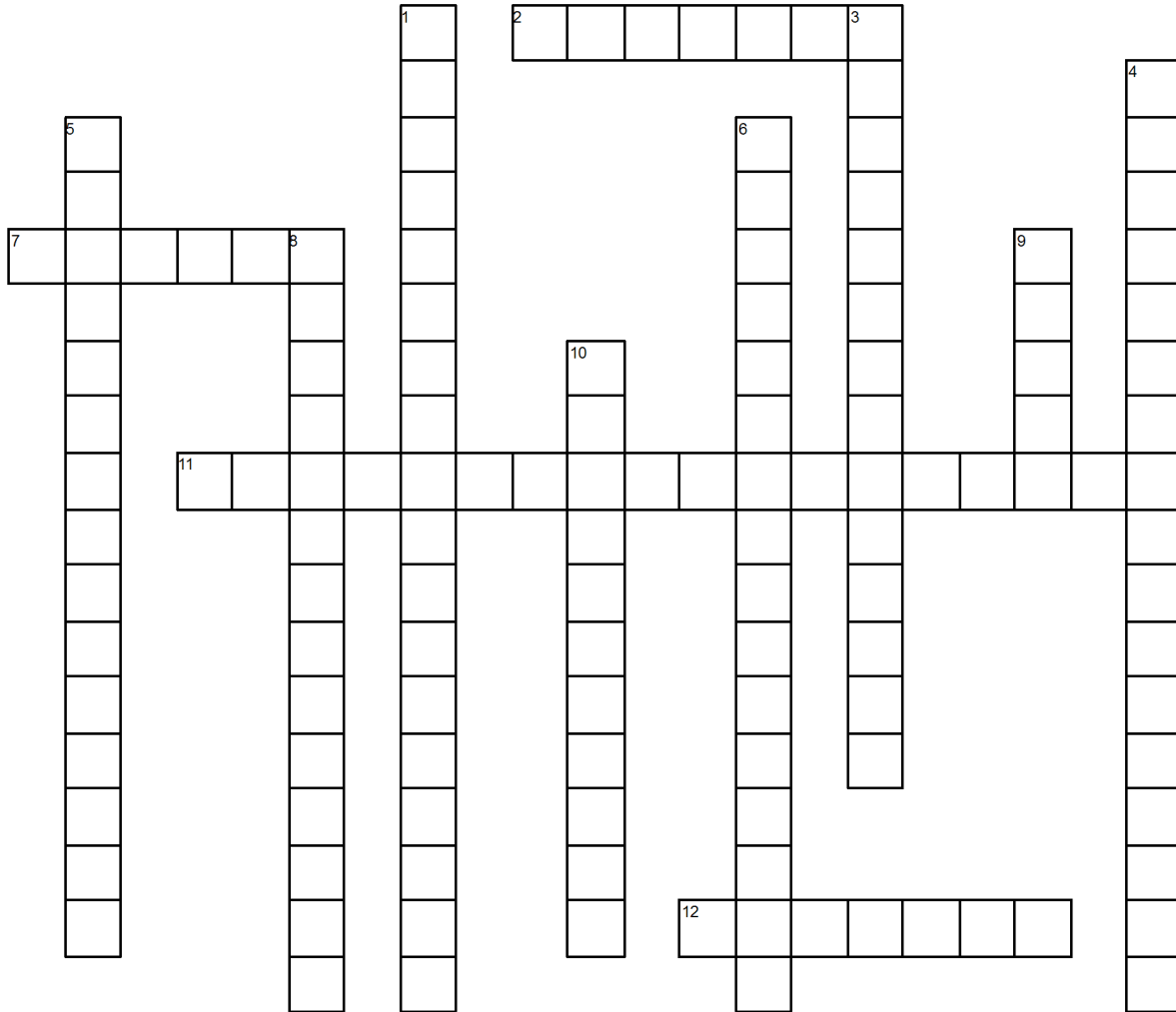
**Complete each statement by writing the correct term or phrase in the space provided.**

1. Genetic engineers can add favorable characteristics to a plant by manipulating the plant's \_\_\_\_\_.
2. Some genetically engineered plants are now resistant to a(n) \_\_\_\_\_ called glyphosate.
3. Crops that are resistant to insects do not need to be sprayed by \_\_\_\_\_.
4. Some scientists are concerned that using glyphosate with GM crops could lead to glyphosate-resistant \_\_\_\_\_.

**Read each question, and write your answer in the space provided.**

5. Why does genetic technology make it easier to give cows growth hormones?
6. Why are human genes added to the genes of farm animals?
7. What are transgenic animals?
8. What steps did Ian Wilmut take to clone Dolly?

**Crossword Puzzle of Vocabulary – clues on next page**



www.CrosswordWeaver.com

## ACROSS

2 a circular DNA molecule that is usually found in bacteria and that can replicate independently of the main chromosome

7 any agent, such as a plasmid or a virus, that can incorporate foreign DNA and transfer that DNA from one living thing to another; an intermediate host that transfers a pathogen or a parasite to another living thing

11 a research effort to sequence and locate the entire collection of genes in human cells

12 a substance that is prepared from killed or weakened pathogens or from genetic material and that is introduced into a body to produce immunity

## DOWN

1 a technology in which the genome of a living cell is modified for medical or industrial use

3 the pattern of bands that results when an individual's DNA fragments are separated by electrophoresis

4 an enzyme that destroys foreign DNA molecules by cutting them at specific sites

5 the process by which electrically charged particles in a liquid move through the liquid because of the influence of an electric field

6 an animal into which cloned genetic material has been transferred

8 DNA molecules that are artificially created by combining DNA from different sources

9 a strand of RNA or singlestranded DNA that has been labeled with a radioactive element or fluorescent dye and that is used to bind with and identify a specific gene in genetic engineering

10 the process of isolating a gene or piece of gene in the genome of a living thing and inserting the gene or gene piece into a plasmid vector to make a lot of copies