

Genetic Engineering Worksheet

For Questions 1–3, complete each statement by writing in the correct word or words.

1. Genetic engineers can transfer genes from one organism to another.
2. A Vector (plasmid) is used to introduce the recombinant DNA to the target organism.
3. In order for the isolated gene to properly insert into the host DNA, the same restriction enzymes must be used to cut both molecules.

Steps to Genetic Engineering

4. Sequence the following steps of genetic engineering:

- 2 Mix the DNA fragments together to produce recombinant DNA
- 1 Isolate the desired gene and cut open the host DNA using the same restriction enzyme
- 4 Screen for cells that contain the recombinant DNA
- 3 Introduce the recombinant DNA to the target cells

Changing DNA

For Questions 5–8, write the letter of the correct answer on the line at the left.

- B 5. Why is DNA ligase so important in recombinant DNA technology?
 - A. It causes DNA to make multiple copies of itself.
 - B. It joins two DNA fragments together.
 - C. It shapes bacterial DNA into a circular plasmid.
 - D. It cuts DNA into restriction fragments.
- D 6. A recombinant plasmid can be used to
 - A. prevent nondisjunction at meiosis.
 - B. double the number of chromosomes in a plant cell.
 - C. cut DNA into restriction fragments.
 - D. transform a bacterium.
- C 7. What do genetic engineers use to create the “sticky ends” needed to splice two fragments of DNA together?
 - A. an amino acid sequence
 - B. DNA ligase
 - C. restriction enzymes
 - D. mRNA
- B 8. Why must a genetically engineered plasmid contain a genetic marker?
 - A. to prevent the construction of an artificial chromosome
 - B. to separate cells that contain recombinant DNA from those that do not
 - C. to produce multiple copies of the recombined plasmid after heat treatment
 - D. to break apart the circular plasmid and introduce another DNA fragment

9. Give a reason why a plasmid is useful for DNA transfer.

1) It has a sequence that helps promote plasmid and the recombinant DNA replication

2) It has a genetic marker that makes it possible to identify which bacteria contain the plasmid

10. What does PCR stand for and what is the end result of this process?

Polymerase chain reaction, the end result of this process is the replication of the desired DNA by MANY fold

Transgenic Organisms

11. What is a transgenic organism?

An organism that contains DNA from another organism

12. What is a clone?

An organism or cell that is produced asexually and is identical to the stock cell

13. What kinds of mammals have been cloned in recent years?

Carp, cat, cattle, deer, dog, frog, goat, horse, mouse, sheep, monkey, rabbit, pig, mule, Wolf ...

For Questions 14–16, write True if the statement is true. If the statement is false, change the underlined word to make the statement true.

F 14. An organism that contains one or more genes from another species is inbred. **transgenic**

F 15. Transgenic organisms can be made by inserting recombinant DNA into the genome of ~~the host~~ organism. **a NEW organism**

F 16. Examining the properties of a transgenic organism allows scientists to discover the function of the transferred chromosome. **gene**

For questions 17-20, write T next to an example of a transgenic organism, and C next to an example of a clone.

T 17. A goat that produces spider's silk in its milk

C 18. A lamb that is born with the same DNA as a donor cell

C 19. A colony of bacteria that grows from one bacterium

T 20. A bacterium that can produce human insulin