

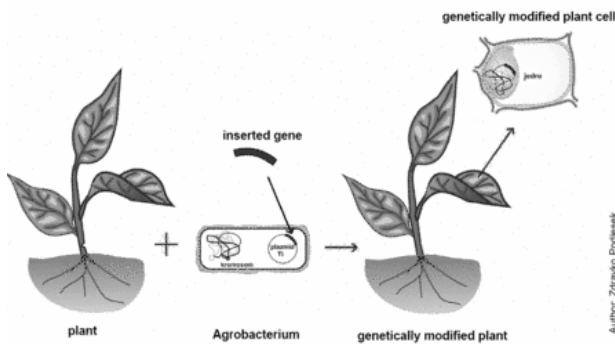
BIOTECHNOLOGY WORKSHEET

Transgenic Organisms:

1. Put the following steps to creating a transgenic organism in order:

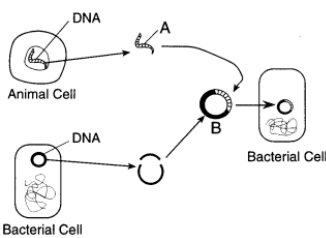
- _____ Put the DNA back into Organism 2
- _____ Insert the DNA into the DNA of Organism 2 (mix them)
- _____ Take the desired gene from Organism 1
- _____ Organism 2 has a new trait
- _____ Organism 2 undergoes mitosis

2. Explain in your own words what has taken place in the image below:



Answer the following multiple choice questions:

3. Which statement best describes the result of some of the processes involved in genetic engineering?
 - A. They alter the arrangement of hereditary material.
 - B. They provide energy for mitosis and meiosis.
 - C. They are necessary for normal gamete formation.
 - D. They reduce variation in organisms that reproduce asexually.
4. Strawberries have been created to resist the harmful effects of frost. This is an application of what?
 - A. Genetic engineering
 - B. DNA fingerprinting
 - C. Gene therapy
 - D. Cloning
5. A gene that codes for resistance to glyphosate, a biodegradable weed killer, has been inserted into certain plants. As a result, these plants will be more likely to
 - A. Produce chemicals that kill weeds growing near them
 - B. Die when exposed to glyphosphate
 - C. Convert glyphosphate into sun energy
 - D. Survive when glyphosphate is applied to them
6. The technique illustrated in the diagram is most likely



- A. Cloning B. Protein synthesis C. Gel electrophoresis D. Genetic engineering

Design your own! You are a very successful scientist and know everything about making transgenic organisms.

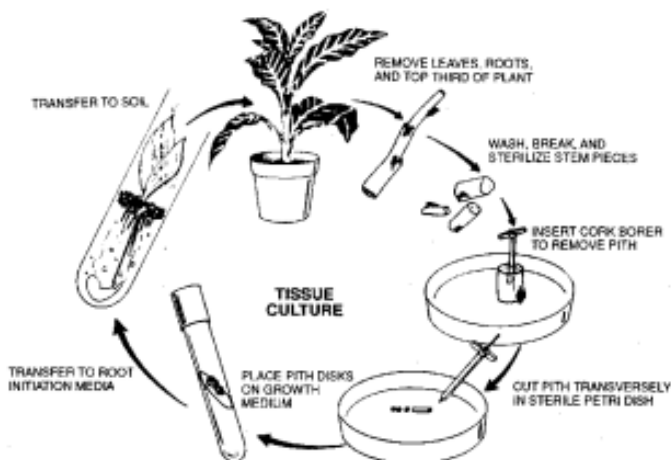
7. You want to invent a new organism that will be useful to society in some way. What will you create?
 - a. What two sets of DNA will you combine?
 - b. What will the new organism be able to do?
 - c. Why will this benefit society?
 - d. Draw a picture of what you will do in the lab to make the organism (hint: refer to your notes)

Cloning:

8. In your own words, what is cloning?

Answer the following multiple choice questions:

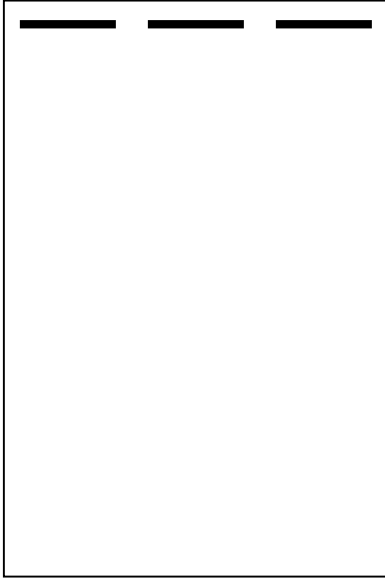
9. By which process can a group of genetically identical plants be produced from the cells of a single plant?
 - A. Screening
 - B. Genetic engineering
 - C. Cloning
 - D. Meiosis
10. The cloning of cells involves the process of:
 - A. Meiotic cell division
 - B. Mitotic cell division
 - C. Fusion of gametes
 - D. Separating DNA fragments
11. Which statement concerning an organism produced by cloning is correct?
 - A. The clone is genetically identical to its parents
 - B. The clone has the combined genes of both its parents
 - C. The genotype of the clone will be somewhat different from its parent
 - D. The phenotype of the clone will be entirely different from the parent
12. What technique is represented by the diagram?



- A. Hybridization
- B. Genetic engineering
- C. Cloning
- D. Fertilization

DNA Fingerprinting:

13. Draw a DNA fingerprint that shows three plants. Two plants should be of the SAME species, and the third plant is of a different species:

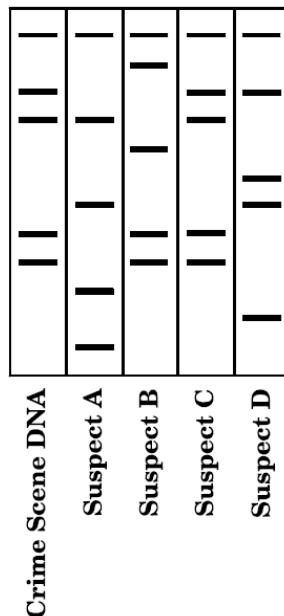


Explain your drawing:
WHY are two plants more similar than the third?

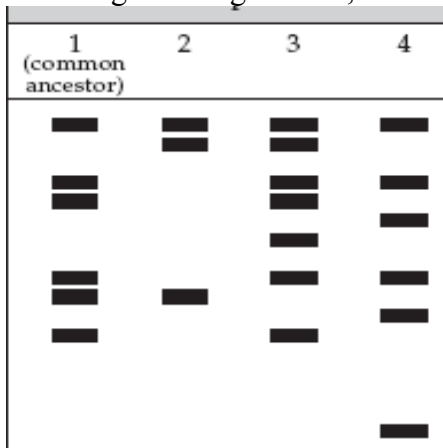
Answer the following multiple choice questions:

14. What is the process that is used to create a DNA fingerprint called?
- Meiosis
 - Transgenic organism
 - Gel electrophoresis
 - Cloning
15. In order to make a DNA fingerprint, the pieces of DNA must be separated by which of the following?
- Magnetic properties
 - Size
 - Shape
 - Number of amino acids
16. Which suspect is linked to the crime scene by this DNA analysis?
- Suspect A
 - Suspect B
 - Suspect C
 - Suspect D

Gel Electrophoresis Results

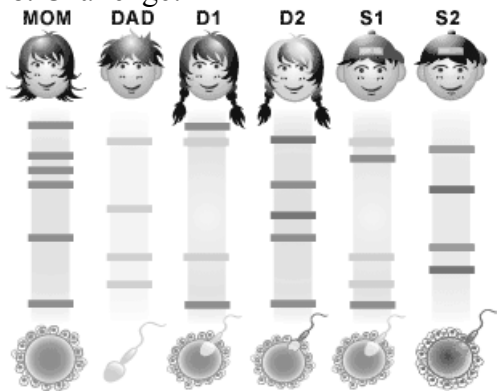


17. Using the image below, which plant species is most closely related to the common ancestor?



- A. Species 2
- B. Species 3
- C. Species 4
- D. They are equally related

18. Challenge!



19. In this cartoon family, the mother and father have 1 adopted child and 1 child they had together. In addition, the mother had 1 child from a previous relationship and the father had 1 child from a previous relationship.
- a. Which child is the adopted child?
 - b. Which child is the mother's child from a previous relationship?
 - c. Which child did both parents have together?
 - d. Which child is the father's child from a previous relationship?