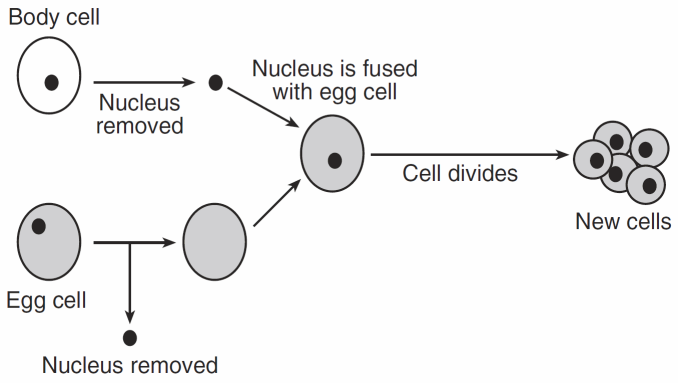
Name **Class**

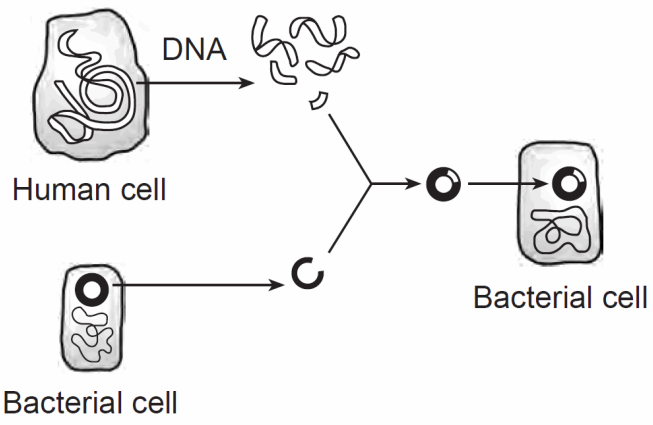
1. A technique used to alter cells is represented in the diagram below.



The genetic material contained in the nucleus of each of the new cells is most likely

1) identical to that in the original body cell
2) identical to that in the original egg cell
3) 50% the same as the original egg cell and 50% the same as the original body cell
4) 25% the same as the original egg cell and 7.5% the same as the original body cell

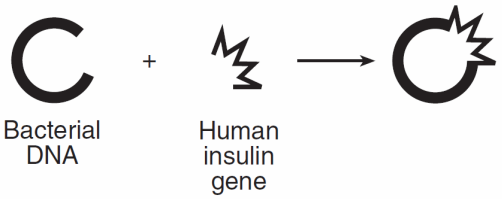
2. The diagram below represents a scientific technique in use today.



Scientists have used this technique to

1) produce hormones for human use at a lower cost than other methods
2) produce pathogens that are able to live in humans
3) clone human cells with desired characteristics
4) eliminate the need for laboratory production of medicines for humans

3. Which statement would most likely be used to describe the procedure represented in the diagram below?



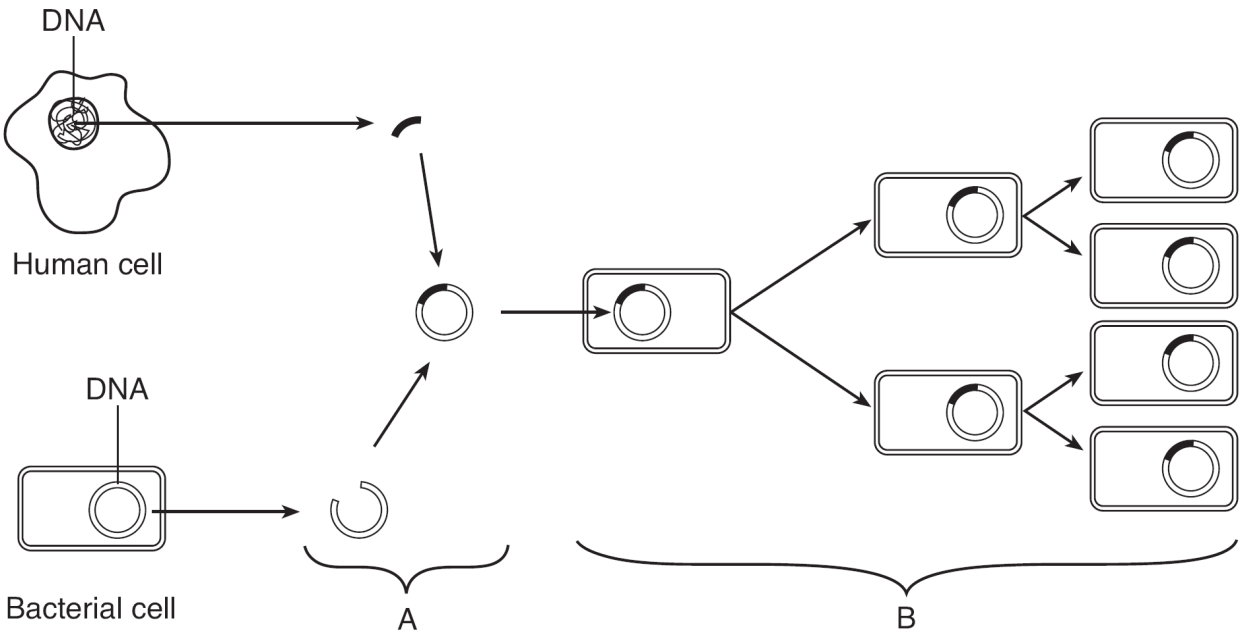
1) Enzymes are used to assemble an insulin gene, which is then attached to bacterial DNA.
2) Bacterial DNA is cut from a human DNA strand and inserted into a human cell to form an insulin gene.
3) The insulin gene is cut out of a human DNA strand using an enzyme and inserted into bacterial DNA, resulting in a combination of different DNA segments.
4) A gene is deleted from bacterial DNA to produce an insulin gene, which is then inserted into human DNA.

4. In some people, the lack of a particular enzyme causes a disease. Scientists are attempting to use bacteria to produce this enzyme for the treatment of people with the disease. Which row in the chart below best describes the sequence of steps the scientist would most likely follow?

Row	Step A	Step B	Step C	Step D
(1)	identify the gene	insert the gene into a bacterium	remove the gene	extract the enzyme
(2)	insert the gene into a bacterium	identify the gene	remove the gene	extract the enzyme
(3)	identify the gene	remove the gene	insert the gene into a bacterium	extract the enzyme
(4)	remove the gene	extract the enzyme	identify the gene	insert the gene into a bacterium

1) 1 2) 2 3) 3 4) 4

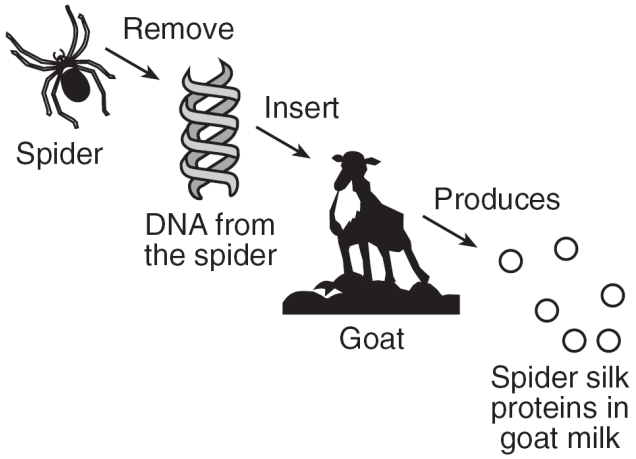
5. Base your answer to the following question on the diagram below and on your knowledge of biology.



Which process is indicated by letter *B*?

1) natural selection
2) asexual reproduction
3) sexual reproduction
4) gene deletion

6. Which process is illustrated in the diagram below?



1) chromatography
2) direct harvesting
3) meiosis
4) genetic engineering

7. Researchers Cohn and Boyer transferred a gene from an African clawed frog into a bacterium. To accomplish this, these scientists had to use

1) enzymes to cut out and insert the gene
2) hereditary information located in amino acids
3) radiation to increase the gene mutation rate of the bacterial cells
4) cancer cells to promote rapid cell division

8. Which statement best describes human insulin that is produced by genetically engineered bacteria?

1) This insulin will not function normally in humans because it is produced by bacteria.
2) This insulin is produced as a result of human insulin being inserted into bacteria cells.
3) This insulin is produced as a result of exposing bacteria cells to radiation, which produces a mutation.
4) This insulin may have fewer side effects than the insulin previously extracted from the pancreas of other animals.

9. Base your answer to the following question on the information below.

Some geneticists are suggesting the possibility of transferring some of the genes that influence photosynthesis from an efficient variety of crop plant to a less efficient crop plant to produce a new variety with improved productivity.

To produce this new variety, the project would most likely involve

1) amniocentesis
2) genetic screening
3) genetic engineering
4) inbreeding

10. In genetic engineering, the transfer of hereditary information from one species to another results in the formation of

    1) motile gametes
    2) recombinant DNA
    3) dihybrids
    4) zygotes

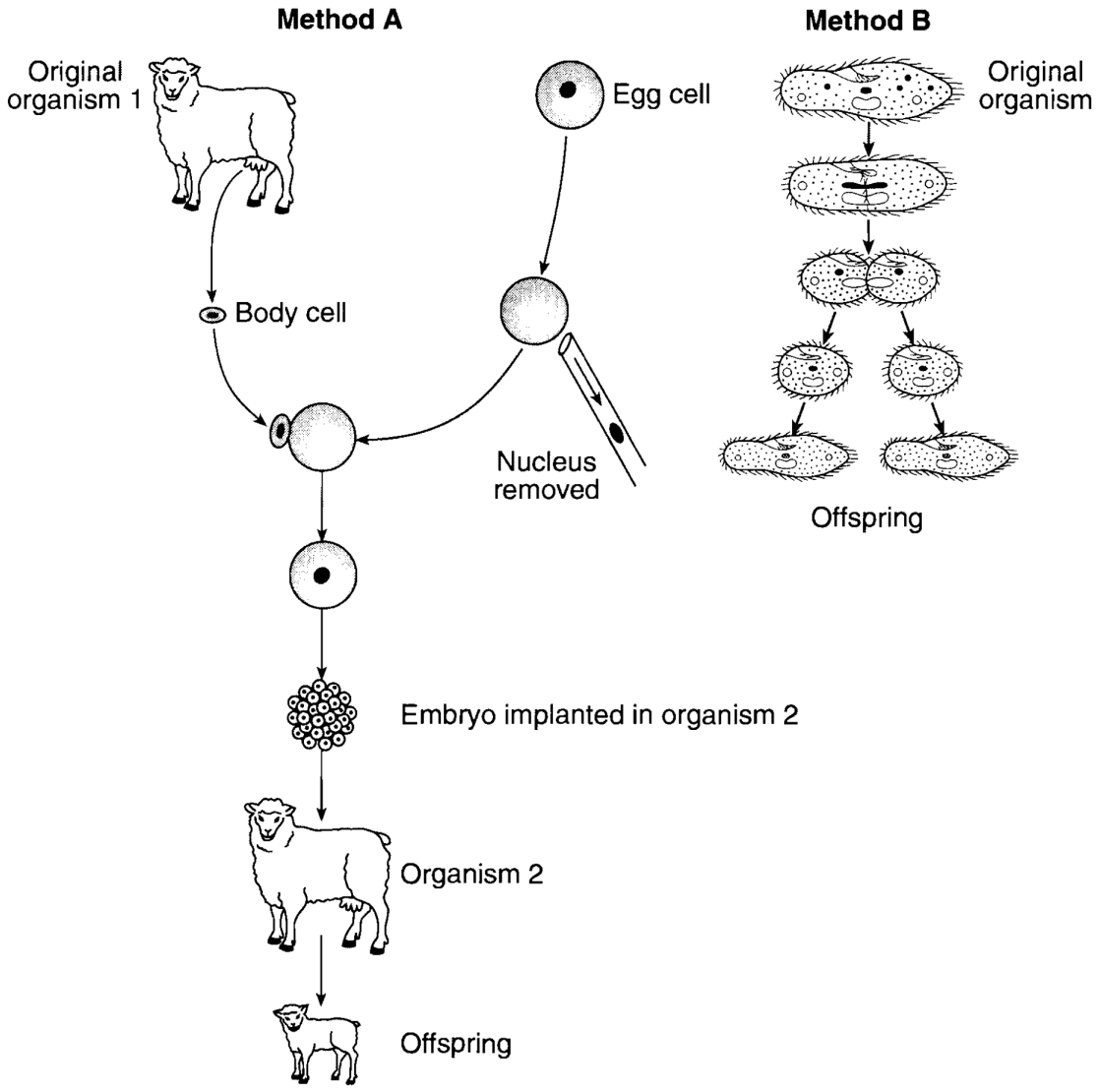
11. What has genetic engineering been used to produce?

    1) salivary amylase
    2) human growth hormone
    3) hydrochloric acid
    4) uric acid crystals

12. Modem technology could be used to clone pet dogs and cats. The cloned animals would resemble the original pets because

    1) the genes of the new animals are different from those of the original pets
    2) half of the genetic information of the new animals is the same as that of the original pets
    3) the new animals have mutations not found in the original pets
    4) the new animals have the same genetic information as the original pets

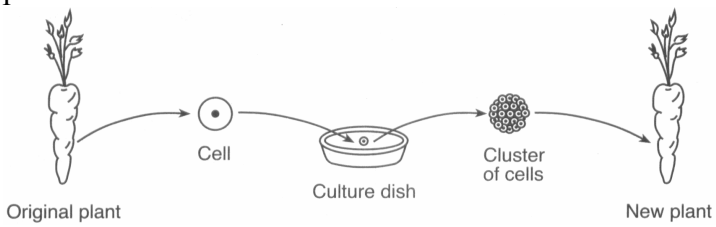
13. Two methods of reproduction are represented in the diagram below.



How does the DNA in the offspring produced by these methods compare to the DNA in the original organism?

1) The offspring contain half the original number of chromosomes in each method.
2) The DNA in the offspring is genetically identical to that of the original organism in both methods.
3) The offspring produced by method A *contain twice the original number of genes, while those produced by method B contain half the original number of genes.*
4) The number of DNA bases is less than that of the original organism in method A,but more than the original number in method B.

14. The diagram below represents the cloning of a carrot plant.



Compared to each cell of the original carrot plant, each cell of the new plant will have

1) the same number of chromosomes and the same types of genes
2) the same number of chromosomes, but different types of genes
3) half the number of chromosomes and the same types of genes
4) half the number of chromosomes, but different types of genes

15. From a single monkey, an animal breeder claims that he has successfully cloned two monkeys. He displays the two monkeys, a male and a female, to the public. The claim of the breeder should be rejected because the monkeys

1) are twins
2) have the same parents
3) are of two different sexes
4) developed from more than one sperm cell