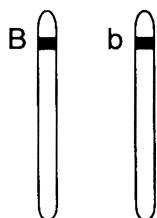


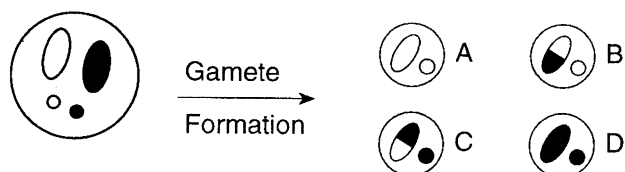
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1. The diagram below represents a pair of homologous autosomes.



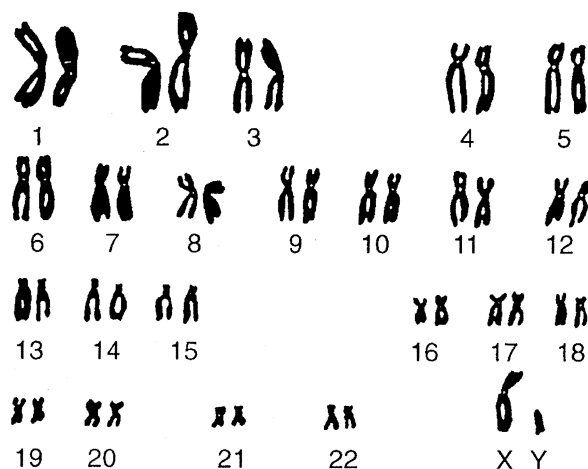
The letters *B* and *b* represent genes for a certain trait. These letters also represent

- (1) an allelic pair of genes
 - (2) linked genes
 - (3) genes for sex determination
 - (4) homozygous genes
2. Genes for two different traits that are located next to each other on the same chromosome would most likely be
- (1) inherited separately
 - (2) codominant
 - (3) recombined
 - (4) inherited together
3. In the diagram below, which type of change most likely caused the new combination of traits in gametes *B* and *C*?



- (1) an alteration in the chemical composition of a gene
 - (2) a change in the chromosome number due to nondisjunction
 - (3) a change in the chromosome composition due to crossing-over
 - (4) an alteration in the number of sugars in DNA
4. Which situation would most directly affect future generations naturally produced by a maple tree?
- (1) Ultraviolet radiation changes the DNA sequence within some leaves of the tree.
 - (2) Ultraviolet radiation changes the DNA sequence within the gametes of some flowers of the tree.
 - (3) An increase in temperature reduces the number of cell divisions in the roots.
 - (4) Rapidly growing cells just under the bark are exposed to radiation, causing changes in genetic material.

5. Which statement best describes chromosomal mutations?
- (1) They only involve changes in the chromosome number.
 - (2) They only involve changes in the chromosome structure.
 - (3) They involve changes in the chromosome number or the chromosome structure.
 - (4) They never involve changes in the chromosome number or the chromosome structure.
6. The addition, removal, or substitution of nitrogenous bases in a DNA molecule may be caused by
- (1) mutagenic agents
 - (2) cloning
 - (3) vegetative propagation
 - (4) nondisjunction
7. Genetic information is shown in the diagram below.



This type of diagram is used to

- (1) reveal chromosome disorders
 - (2) determine the number of genes in a human genotype
 - (3) detect sickle-cell anemia
 - (4) correct the disorder known as PKU
8. One similarity between DNA and messenger RNA molecules is that they both contain
- (1) the same sugar
 - (2) genetic codes based on sequences of bases
 - (3) a nitrogenous base known as uracil
 - (4) double-stranded polymers
9. A medical test indicates that a patient has a defective protein. This condition is most likely due to a change in the directions coded in the
- (1) number of hydrogen atoms in starch molecules
 - (2) sequence of inorganic molecules
 - (3) number of carbon atoms in sugar molecules
 - (4) sequence of subunits in DNA

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10. The code of a gene is delivered to the enzyme-producing region of a cell by a
- (1) hormone
 - (2) nerve impulse
 - (3) messenger RNA molecule
 - (4) DNA molecule
11. What is the complementary messenger-RNA sequence for the DNA sequence shown below?
- C A A G G T
| | | | |
- (1) C-A-A-G-G-U
 - (2) G-T-T-C-C-A
 - (3) G-U-U-C-C-A
 - (4) C-A-A-G-G-T
12. The coded information in a DNA molecule directly determines the formation of
- (1) polypeptides
 - (2) polysaccharides
 - (3) lipids
 - (4) monosaccharides
13. What is the relationship between an organism's DNA and protein specificity?
- (1) DNA becomes a specific part of the protein structure.
 - (2) DNA determines the ribosomal RNA sequence that becomes part of the protein structure.
 - (3) DNA determines which RNA molecules are incorporated into protein molecules.
 - (4) DNA determines the amino acid sequence of each protein.
14. In 1994, a new tomato variety that ripens slowly was developed by a laboratory technique that did not involve methods of natural reproduction. This new variety contains a section of a DNA molecule not found in the tomato from which it was originally developed. Which technique was most likely used to develop this new variety of tomato?
- (1) amniocentesis
 - (2) cross-pollination
 - (3) genetic engineering
 - (4) karyotyping
15. A common practice used by breeders to maintain a desired trait in dogs is
- (1) artificial selection
 - (2) regeneration
 - (3) vegetative propagation
 - (4) sporulation
16. Which concept provides an explanation for the process by which cellular activities are indirectly controlled by the nucleus?
- (1) one gene—one polypeptide hypothesis
 - (2) fluid-mosaic model
 - (3) theory of evolution
 - (4) heterotroph hypothesis
17. Many diabetics are now using insulin that was made by certain bacteria. The ability of these bacteria to produce insulin was most likely the result of
- (1) deleting many DNA segments from bacterial DNA
 - (2) genetic mapping of bacterial DNA to activate the gene for insulin production
 - (3) inserting a portion of human DNA into the ring-shaped DNA of bacteria
 - (4) using radiation to trigger mutations
18. In recent research, the DNA that codes for a different key enzyme was removed from each of three different species of soil bacteria. A new bacterium containing DNA for all three key enzymes was produced by
- (1) inbreeding
 - (2) hybridization
 - (3) mutagen screening
 - (4) genetic engineering