Genes - Multiple Choice Worksheet

Name: _____
Date: _____

Instructions: Choose the correct answer from the options provided.

1. **What is a gene?**
   a) A segment of DNA that codes for a specific protein
   b) A molecule that carries oxygen in the blood
   c) A unit of heredity located on a chromosome
   d) Both a and c

2. **Where are genes located in a cell?**
   a) In the nucleus
   b) On chromosomes
   c) In the cytoplasm
   d) Both a and b

3. **What is the relationship between DNA and genes?**
   a) Genes are segments of DNA
   b) DNA is composed of genes
   c) Both contain genetic information
   d) None of the above

4. **What are alleles?**
   a) Different versions of a gene
   b) Identical copies of a gene
   c) Chromosomes with the same genes
   d) None of the above

5. **What does it mean for an organism to be homozygous for a trait?**
   a) It has two identical alleles for that trait
   b) It has two different alleles for that trait
   c) It has only one allele for that trait
   d) None of the above

6. **What is a genotype?**
   a) The physical expression of a trait
   b) The genetic makeup of an organism
   c) The combination of alleles an organism has
   d) Both b and c

7. **What is a phenotype?**
   a) The physical expression of a trait
   b) The genetic makeup of an organism
   c) The combination of alleles an organism has
   d) None of the above

8. **What is the purpose of a Punnett square?**
   a) To predict the probability of offspring inheriting certain traits
   b) To determine the genotype of an organism
   c) To identify mutations in genes
   d) None of the above

9. **What is a mutation?**
   a) A change in the DNA sequence of a gene
   b) An alteration in the number of chromosomes
   c) A modification in the physical expression of a trait
   d) None of the above

10. **What is the role of RNA in gene expression?**
    a) It carries genetic information from DNA to the ribosome
    b) It serves as a template for protein synthesis
    c) It regulates gene expression
    d) Both a and b

11. **What are sex-linked genes?**
    a) Genes located on the X or Y chromosomes
    b) Genes that determine the sex of an organism
    c) Genes inherited from both parents
    d) None of the above

12. **What is codominance?**
    a) Both alleles are fully expressed in the phenotype
    b) One allele masks the expression of another
    c) Alleles blend to create a new trait
    d) None of the above

13. **What is a pedigree?**
    a) A chart that shows the inheritance of a trait over several generations
    b) A diagram that displays the structure of a gene
    c) A record of an organism's genetic makeup
    d) None of the above

14. **How many chromosomes do humans have in their somatic cells?**
    a) 23
    b) 46
    c) 92
    d) None of the above

15. **What is meiosis?**
    a) A type of cell division that results in four daughter cells with half the number of chromosomes of the parent cell
    b) A process of gene replication
    c) A method of asexual reproduction
    d) None of the above

16. **What is the difference between dominant and recessive alleles?**
    a) Dominant alleles are always expressed when present; recessive alleles are only expressed when two copies are present
    b) Recessive alleles are stronger than dominant alleles
    c) Dominant alleles are inherited from the father; recessive alleles from the mother
    d) None of the above

17. **What is polygenic inheritance?**
    a) A trait that is influenced by multiple genes
    b) Inheritance of multiple traits from one parent
    c) A gene that affects multiple traits
    d) None of the above

18. **What is the central dogma of molecular biology?**
    a) DNA → RNA → Protein
    b) Protein → RNA → DNA
    c) RNA → DNA → Protein
    d) None of the above

19. **What is a zygote?**
    a) A fertilized egg cell
    b) A cell that has undergone meiosis
    c) A mature gamete
    d) None of the above

20. **What is gene expression?**
    a) The process by which information from a gene is used to synthesize a functional gene product (usually a protein)
    b) The physical manifestation of a trait
    c) The replication of DNA
    d) None of the above

Answer Key

1. d) Both a and c
2. d) Both a and b
3. a) Genes are segments of DNA
4. a) Different versions of a gene
5. a) It has two identical alleles for that trait
6. d) Both b and c
7. a) The physical expression of a trait
8. a) To predict the probability of offspring inheriting certain traits
9. a) A change in the DNA sequence of a gene
10. d) Both a and b
11. a) Genes located on the X or Y chromosomes
12. a) Both alleles are fully expressed in the phenotype
13. a) A chart that shows the inheritance of a trait over several generations
14. b) 46
15. a) A type of cell division that results in four daughter cells with half the number of chromosomes of the parent cell
16. a) Dominant alleles are always expressed when present; recessive alleles are only expressed when two copies are present
17. a) A trait that is influenced by multiple genes
18. a) DNA → RNA → Protein
19. a) A fertilized egg cell
20. a) The process by which information from a gene is used to synthesize a functional gene product (usually a protein)