**Pre-AP Unit 6 Genetics and Genetic Engineering Test Review**

*Refer to the following questions and vocabulary to help you to review for the test.*

* Required vocabulary: allele, genotype, phenotype, homo/heterozygous, hybrid, purebred, P, F1, F2, independent assortment, law of segregation, fertilization, monosomy, trisomy, carrier, dominant/ recessive, sex chromosomes, autosomes, genders (XX, XY), genetic variation, selective breeding, hybridization, inbreeding, polyploid, biotechnology, gene therapy, recombinant DNA, sexual/asexual reproduction, plasmid, restriction enzymes, polygenetic trait, transgenic organism, and clone

1. What is genetics?
   1. What macromolecule serves as the basis of genetics?
2. What does ‘P’ generation mean?
3. What does ‘F1’ generation mean?
4. What does ‘F2’ generation mean?
5. How does fertilization change the number of chromosomes in a cell?
6. What is a trait?
7. What is a purebred?
8. What is a hybrid?
9. What is a gene?
   1. What is an allele?
      1. Give an example of an allele.
      2. What is a dominant allele?
         1. What does a dominant allele code for?
      3. What is a recessive allele?
         1. Give an example.
      4. How do the differences in the type of allele affect protein synthesis?
   2. What is a genotype?
      1. Give an example.
   3. What is a phenotype?
      1. Give an example.
   4. What is meant by homozygous?
      1. Give an example.
   5. What is meant by heterozygous?
      1. Give an example.
      2. Why are heterozygous individuals considered carriers of select diseases?
   6. In a heterozygous genotype, what is phenotype of an individual?
10. What does the principle of dominance state?
11. What does segregation mean?
    1. What is a gamete?
12. What is probability?
13. What is a Punnett square?
14. What does the principle of independent assortment state?
    1. What is the effect of independent assortment on gametes?
15. What is a dihybrid cross?
    1. What principles are applicable to the genotype of the offspring?
    2. If two parents are heterozygous for 2 traits, what are the possible genotypes of the offspring?
16. What is incomplete dominance?
    1. Give an example.
17. What is codominance?
    1. Give an example.
18. What is multiple alleles?
    1. Give an example of a trait controlled by multiple alleles.
19. What is a polygenic trait?
    1. Give an example
20. Can the environment affect the phenotype of an organism?
21. What is a karyotype?
    1. What are sex chromosomes?
    2. What are autosomes?
    3. What information can be derived from a karyotype?
       1. How can you determine whether monosomy or trisomy exists?
22. What are the genotypes of the various blood types?
    1. Blood types are an example of which non-Mendelian principle?
    2. What are the Rh factors in blood?
23. What is sex-linked inheritance?
    1. What chromosome is involved in sex-linked inheritance?
       1. What is the genotype of a male?
       2. What is the genotype of a female?
    2. What are examples of sex-linked disorders?
    3. Why are males more likely to have sex-linked disorders?
24. What is a pedigree chart?
    1. What does a circle and square indicate?
    2. What does a shaded circle or square indicate?
    3. Draw an example of a pedigree chart.
25. What is nondisjunction?
    1. What are 2 examples of diseases caused by nondisjunction?
26. How can scientists manipulate DNA?
    1. What are restriction enzymes?
    2. What is gel electrophoresis?
       1. What is the effect of gel electrophoresis?
    3. What is polymerase chain reaction (PCR)?
       1. What is the effect/result of PCR?
    4. What is recombinant DNA?
       1. Give an example of recombinant DNA.
    5. What is a plasmid?
       1. What is the relationship between a plasmid and recombinant DNA technology?
    6. What is a transgenic organism?
       1. What are some helpful uses of transgenic organisms?
    7. What is a clone?
    8. What is the human genome project?
    9. What is gene therapy?
    10. What is DNA fingerprinting?
    11. What is a genetically modified (GM) product?
        1. What are advantages of GM products?
27. What is selective breeding?
    1. What is an example of selective breeding?
    2. What is hybridization?
       1. What is an advantage of hybridization?
       2. What is a disadvantage of hybridization?
       3. What is the result on genetic variation?
    3. What is inbreeding?
       1. What is an advantage of inbreeding?
       2. What is a disadvantage of inbreeding?
       3. What is the result on genetic variation?
28. What are sources of genetic variation?
29. What is a polyploid organism?
    1. What is an advantage of polyploidy?