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