**Genetics Test Study Guide**

***Directions:*** *Answer the following questions as completely and as thoroughly as possible.*

1. What is *heredity?*
2. Who is considered to be the “Father of genetics” because of his studies on pea plants?
3. Explain Mendel’s experiments with Pea Plants.
4. Define and explain the following terms of genetics:
   1. **Gene:**
   2. **Allele:**
   3. **Purebred:**
   4. **Hybrid:**
   5. **Dominant allele:**
   6. **Recessive allele:**
   7. **Phenotype:**
   8. **Genotype:**
   9. **Homozygous dominant:**
   10. **Homozygous recessive:**
   11. **Heterozygous:**
5. Complete the following genetic crosses using a Punnett Square:

* **Rr X Rr;** R= red hair, and r=blue hair
* **YY x yy;** Y= yellow eyes; y= purple eyes
* **Ss X SS;** S = superpower; s = no superpower

1. How many *pairs* of chromosomes do humans have? How many chromosomes *in all* do humans have?
2. How are genes passed on from generation to generation (parent to offspring)?
3. What are the two different types of reproduction? EXPLAIN each.
4. What are sex cells and how many chromosomes do they have in all?

What is another name for sex cells?

1. Define the following:
   1. **Homologous chromosomes/pairs:**
   2. **Diploid:**
   3. **Haploid:**

Sex cells are diploid or haploid?

1. What process of cell division do sex cells undergo? How does this process ensure that sex cells only inherit half the total number of chromosomes?
2. Why is it important that sex cells in sexually reproducing organisms, only inherit half the number of chromosomes? And how does this allow for greater genetic variety in a species?
3. Who discovered DNA?
4. DNA is made up of subunits called \_\_\_\_\_\_\_\_\_\_\_\_\_\_? What are the three components that make up these subunits?
5. What are the bases of DNA? WHAT ARE THE BASE PAIRS?
6. How can DNA contain so much information? Why is it possible that with only four bases, thousands of different genes and variations of those genes (alleles) can exist?
7. What do genes code for? What are proteins?
8. How are proteins made? How many bases code for one amino acid?
9. What is a mutation?
10. What are the different types of mutations? Explain each.
    1. Deletion:
    2. Insertion:
    3. Substitution:
11. What is a mutagen?