Honors Biology Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
NDHS Per: \_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_

**Genetics Practice Problems**

**Directions**: Complete all of the following genetics problems and answer any questions in each problem. Where indicated(\*\*), make a key, show the Punnett square, and the genotypic and phenotypic ratios.

1. Using the rules of probability, determine the likelihood of the two parents producing offspring with the specific genotypes.

PARENTS: AaBBccDd X aaBbCcDd

Offspring #1: AaBBccDd

Offspring #2: aaBbCcDD

Offspring #3: AaBbCCdd

1. \*\* In poultry, feathered shanks (legs) are dominant to clean shanks. A heterozygous hen mates with a clean shanked rooster. If the hen lays 12 eggs and they all hatch, how many are likely to have feather legs?

KEY:

Genotypic Ratio:

Phenotypic Ratio:

1. \*\* In dogs, wire hair (S) is [dominant](http://www.ksu.edu/biology/pob/genetics/defin.htm#dom) to smooth (s). In a cross of a [homozygous](http://www.ksu.edu/biology/pob/genetics/defin.htm#hom) wire-haired dog with a smooth-haired dog, what will be the [phenotype](http://www.ksu.edu/biology/pob/genetics/defin.htm#phen) of the [F1 generation](http://www.ksu.edu/biology/pob/genetics/defin.htm#f1)?

 Genotypic Ratio:

Phenotypic Ratio:

1. \*\*Woodrats are medium sized rodents with lots of interesting behaviors. You may know of them as packrats. Let's assume that the trait of bringing home shiny objects (H) is controlled by a single [locus](http://www.ksu.edu/biology/pob/genetics/defin.htm#loc) gene and is [dominant](http://www.ksu.edu/biology/pob/genetics/defin.htm#dom) to the trait of carrying home only dull objects (h). Suppose two [heterozygous](http://www.ksu.edu/biology/pob/genetics/defin.htm#het) individuals are crossed. How many of each [genotype](http://www.ksu.edu/biology/pob/genetics/defin.htm#gen) would be expected if only 4 offspring were produced?

Genotypic Ratio:

Phenotypic Ratio:

1. \*\*In blifflecooters, blue toe nails are dominant over red, but there is a second control gene determines if the color appears. The control gene allows for the blue or red to be seen if it is homozygous recessive. If the control gene has a dominant allele, the toe nails will appear green. These genes are on separate chromosomes. If a red toe nailed blifflecooter mates with a green toe nailed blifflecooter (heterozygous for both traits), what colors will the toe nails of the offspring appear?

KEY:

Genotypic Ratio:

Phenotypic Ratio:

1. \*\*In the breeding season, male Anole lizards court females by bobbing their heads up and down while displaying a colorful throat patch. Assume for this question that both males and females bob their heads and have throat patches. Assume also, that both traits are controlled by single [locus](http://www.ksu.edu/biology/pob/genetics/defin.htm#loc) genes on separate [chromosomes](http://www.ksu.edu/biology/pob/genetics/defin.htm#chrom). Now, suppose that anoles prefer to mate with lizards who bob their heads fast (F) and have red throat patches (R) and that these two alleles are [dominant](http://www.ksu.edu/biology/pob/genetics/defin.htm#dom) to their counterparts, slow bobbing and yellow throats. A male lizard [heterozygous](http://www.ksu.edu/biology/pob/genetics/defin.htm#het) for head bobbing and [homozygous](http://www.ksu.edu/biology/pob/genetics/defin.htm#hom) dominant for the red throat patch mates with a female that is also heterozygous for head bobbing but is homozygous [recessive](http://www.ksu.edu/biology/pob/genetics/defin.htm#rec) for yellow throat patches. How many of the [F1](http://www.ksu.edu/biology/pob/genetics/defin.htm#f1) offspring have the preferred fast bobbing / red throat [phenotype](http://www.ksu.edu/biology/pob/genetics/defin.htm#het) (assume 16 young)?

Genotypic Ratio:

Phenotypic Ratio:

7) \*\*The lubber grasshopper is a very large grasshopper, and is black with red and yellow stripes. Assume that red stripes are expressed from the [homozygous](http://www.ksu.edu/biology/pob/genetics/defin.htm#hom) RR [genotype](http://www.ksu.edu/biology/pob/genetics/defin.htm#gen), yellow stripes from the homozygous rr genotype, and both from the [heterozygous](http://www.ksu.edu/biology/pob/genetics/defin.htm#het) genotype. What will be the [phenotypic ratio](http://www.ksu.edu/biology/pob/genetics/defin.htm#phent) of the [F1 generation](http://www.ksu.edu/biology/pob/genetics/defin.htm#f1) resulting from a cross of two grasshoppers, both with red and yellow stripes (red : both : yellow)?

Genotypic Ratio:

Phenotypic Ratio:

1. \*\*The skin pattern of the green lily pad frogs can be solid green, striped, or spotted. This characteristic is controlled by one gene pair with three allelic possibilities. In this case green is dominant over spotted, and spotted is dominant over striped.

A green male mates with a striped female to produce, green and spotted offspring. Show the cross that demonstrates the male’s genotype.

KEY:

Genotypic Ratio:

Phenotypic Ratio:

1. \*\*The darkness of the skin pattern of the green lily pad frogs is controlled by two gene pairs (dihybrid) which have two allelic possibilities, dark green and pale green. The greater the amount of dark green genes results in darker green skin. If two medium green frogs mate, what is the probability they will have a very pale green offspring?

KEY:

Genotypic Ratio:

Phenotypic Ratio: