Genetics Standard 1 Study Guide Name: KEY **Block:** _____

Identify, explain, and apply Mendelian genetics including laws, simple heredity, and use of Punnett Squares

Make the following vocabulary terms with the correct letter:

- Law of Segregation: J.
- Dominant : B
- Recessive: H.
- Homozygous: C.
- Heterozygous: I.
- Gamete: D.
- Mitosis: E.
- Meiosis: G.
- Allele: A
- Zygote: K.
- Trait: F.

A. Alternate form of a trait
B. Allele that hides another
C. Having two of the same alleles
D. Cell that contains half the number of chromosomes
E. Process of producing body cells
F. Specific characteristic that varies among individuals
G. Process of producing sex cells
H. Allele that is hidden by another
I. Having two different alleles
J. Separation of traits so that only one allele from each parent is passed to offspring
K. Cell produced after fertilization

Punnett Square Practice Problems:
For the following problems, find the genotype and phenotype ratios by constructing a Punnet Square.

1. If a heterozygous brown (B) mouse is crossed with a homozygous recessive white mouse, what are the genotype and phenotype ratios for the potential offspring?

	G	Pheno
parent 1	Bb	Brown
parent 2	bb	white

Bb x bb

	B	b
b	Bb	bb
b	Bb	bb

Offspring
Genotype: 1/2 Bb: 1/2 bb
Phenotype: 1/2 Brown: 1/2 white

2. If a homozygous dominant tall (T) plant is crossed with a homozygous recessive (t) plant, what will be the genotype and phenotype ratios for the potential offspring?

	G	P
parent 1:	TT	Tall
parent 2	tt	short

TT x tt

	T	T
t	Tt	Tt
t	Tt	Tt

Offspring
Genotype: all Tt
Phenotype: all Tall

3. If Ron is heterozygous for the freckle (F) trait and has children with a wife who is also heterozygous for freckles, what will be the genotype and phenotype ratios for their potential offspring?

G P

Ron: Ff Freckles

Wife: Ff " "

Ff x Ff

	F	f
F	FF	Ff
f	Ff	Ff

Kids

Geno: 1/4 FF : 2/4 Ff : 1/4

Pheno: 3/4 Freckles : 1/4 No freckle

What is the probability (percent) that their children will have freckles?

3/4 or 75%

Complete the following chart:

Brown eyes (B) are dominant in humans, blue eyes (b) are recessive.

Genotype	***Phenotype***
BB	Brown
Bb	Brown
bb	blue

Fill In:

The father of genetics, Mendel, used pea plants to develop an understanding of genetics. Today we know that meiosis produces gametes. Gametes are haploid, or have half the number of chromosomes as a normal cell. An example of gametes in humans are sperm or egg; an example in plants is pollen. When two gametes come together through a process called fertilization a zygote (baby) is formed.

Complete the following dihybrid cross:

In rabbits, the coat color black dominant (B) over brown (b). Short hair is dominant (S) over long (s). In a cross between a heterozygous black short-haired male and a brown heterozygous short-haired female, what would be the ratios for genotype and phenotype of the F1 generation?

	BS	Bs	bS	bs
S	BbSS x	BbSs x	bbSS	bbSs
S	BbSS x	BbSs x	bbSS	bbSs
s	BbSs x	Bbss x	bbSs	bbss
s	BbSs x	Bbss x	bbSs	bbss

Parent 1 Genotype: BbSs

Parent 2 Genotype: bbSs

Genotype Ratios:

2/16 BbSS : 4/16 BbSs : 2/16 Bbss :

2/16 bbSS : 4/16 bbSs : 2/16 bbss

Phenotype Ratios:

6/16 Black short : 2/16 Black long :

6/16 brown short : 2/16 brown long