Name _____

Period _____ Date _____

Mendelian Genetics Test Review

Instructions: Complete the Punnett squares and answer all questions for each problem. If you can complete these Punnett squares correctly on your own, you will do well on the test.

Monohybrid Crosses (2 x 2 Punnett Squares)

1. In rabbits, the allele for black fur color is dominant to the allele for brown fur color. Predict the results of a cross between a male rabbit that is homozygous for black fur color and a female rabbit that is heterozygous for black fur color.

Dominant symbol: _____ Recessive symbol: _____

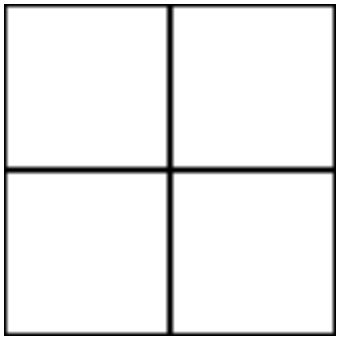
Male alleles: _____ Female alleles: _____

Genotypic %'s: _____

Phenotypic %'s: _____

Genotypic ratio: _____

Phenotypic ratio: _____



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2. Red fruit on tomato plants is dominant to yellow fruit. Cross a homozygous recessive tomato plant with a homozygous dominant tomato plant.

Dominant symbol: _____ Recessive symbol: _____

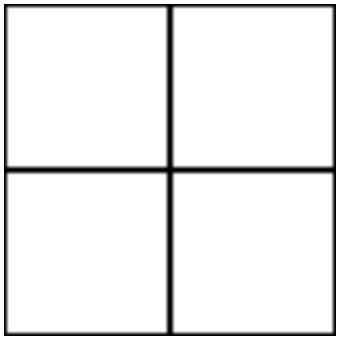
Parent 1 alleles: _____Parent 2 alleles: _____

Genotypic %'s: _____

Phenotypic %'s: _____

Genotypic ratio: _____

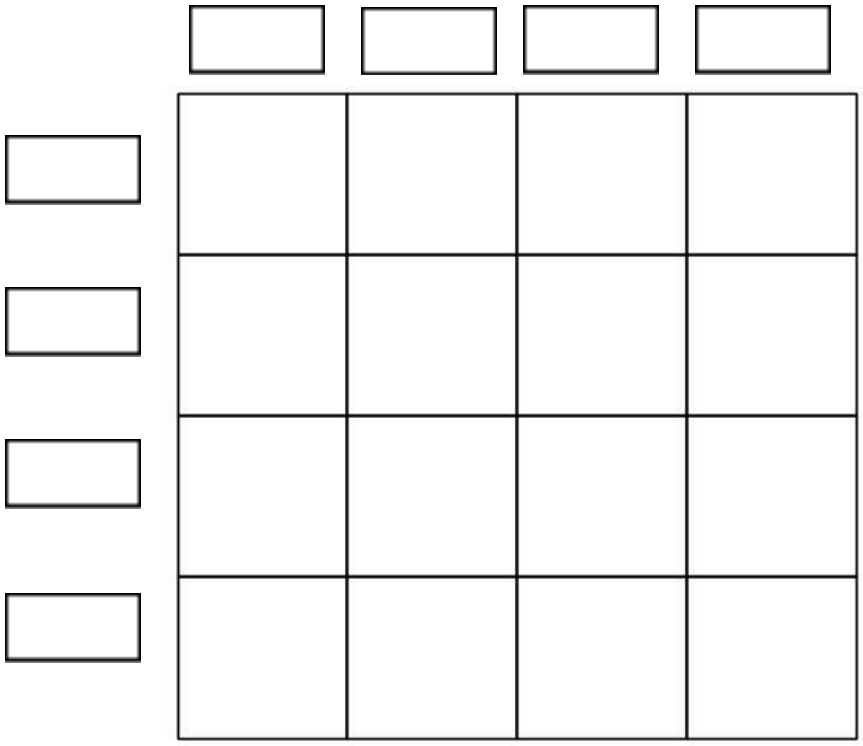
Phenotypic ratio: _____



Dihybrid Crosses (4 x 4 Punnett Squares)

3. In pigs, curly tails are dominant to straight tails and pink color is dominant to gray color. Cross a male pig that is homozygous recessive for both traits with a female pig that is heterozygous for both traits.

Allele Key:	Parents' Genotypes:
● Dominant trait 1: Curly tail = T ● Recessive trait 1: Straight tail = t ● Dominant trait 2: Pink color = G ● Recessive trait 2: Gray color = g	Parent 1: _____ Parent 2: _____
FOIL Parent 1's Alleles: _____ _____ _____ _____	FOIL Parent 2's Alleles: _____ _____ _____ _____

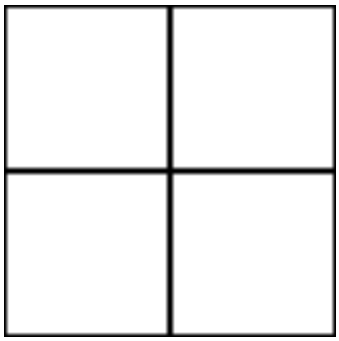


Genotype Percentages:

Phenotype Percentages:

Sex-Linked Traits (2 x 2 Punnett Squares)

4. In humans, hemophilia is a recessive, X-linked disorder. Show a cross between a man that has hemophilia and a woman that is a carrier of hemophilia.



Dominant symbol: _____ Recessive symbol: _____

Male alleles: _____ Female alleles: _____

Phenotypic %'s: _____

Phenotypic ratio: _____

Probability (%) of having a son that has hemophilia? _____

Probability (%) of having a daughter that has hemophilia? _____

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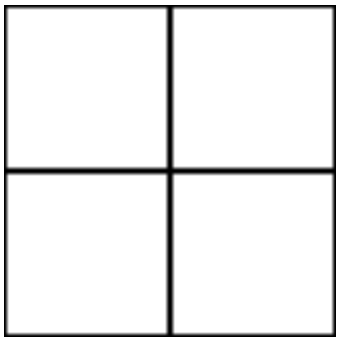
5. In humans, color blindness is a recessive, X-linked disorder. Cross a color blind female with a man that has normal vision.



Dominant symbol: _____ Recessive symbol: _____

Male alleles: _____ Female alleles: _____

Phenotypic %'s: _____

Phenotypic ratio: _____

Probability (%) of having a son that has hemophilia? _____

Probability (%) of having a daughter that has hemophilia? _____

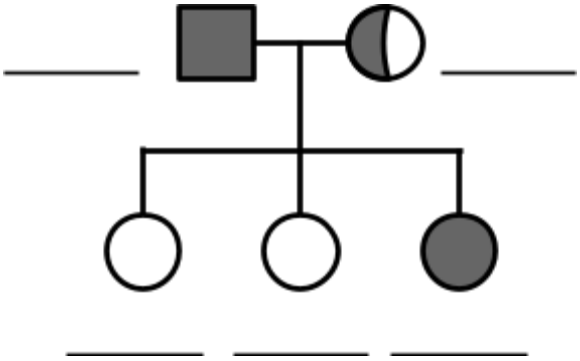
Pedigrees

In humans, albinism is a recessive, X-linked disorder. The disorder causes a lack of pigmentation in the skin, hair, and eyes, making an individual with albinism appear very pale with white hair and pale blue eyes. This disorder occurs in mammals. The pedigrees below trace the inheritance of the allele that causes albinism.

6. Given the following **genotypes** for albinism, determine the phenotype (albino or not albino)

AA = _____ Aa = _____ aa = _____

7. Analyze the pedigree below. On the blank lines next to or below each shape, write the **genotypes** (AA, Aa, or aa) for the pedigree tracking the allele for albinism.



a. How many children does this family have?

b. What are the sexes of the children?

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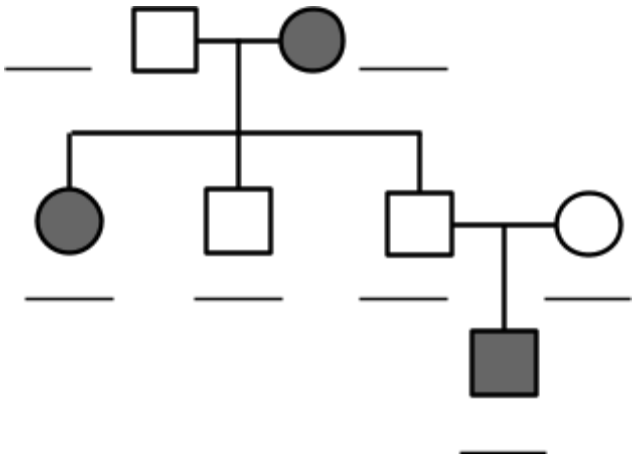
8. Analyze the pedigree below. On the blank lines next to or below each shape, write the **genotypes** (AA, Aa, or aa) for the pedigree tracing the allele for albinism.

CARRIERS ARE <u>NOT</u> HALF SHADED ON THIS PEDIGREE. YOU NEED TO DETERMINE THE CARRIERS BASED ON YOUR KNOWLEDGE OF TRAIT INHERITANCE.



a. How many generations are represented in this pedigree? _____

b. How many males are present in this pedigree? _____

c. How many females are present in this pedigree? _____

d. How many individuals are CARRIERS of albinism in this pedigree? _____

e. How many individuals display albinism in their phenotype? _____

f. How many individuals display the “normal” phenotype (non-albino)? _____

Vocabulary Review: Word Scramble

Scrambled Word	Unscrambled Word	Definition
dtreeihy		The passing of genetic traits from parent to offspring
npoythepe		The displayed physical appearance of an organism
lalele		On member of a pair of genes occupying a specific spot on a chromosome that controls a trait
imdeoncoanc		Both alleles for a gene are expressed in a heterozygous offspring at the same time
svseiecre sirtat		Only expressed when a dominant trait is not present
alw fo ntsrgegeaoi		Pairs of genes separate in meiosis and each gamete receives one pair of the gene
otzeoryhgseu		One gene is dominant, the other gene is recessive
idybhdri		A genetic cross between individuals with alleles for two differing traits
x hmrcoeoosm		A sex chromosome; two are present in females, one is present in males
alw fo depniedtnne trasmtseon		Different pairs of alleles are passed to offspring independently of one another during meiosis
deipgeer		A genetic family tree that tracks a trait from generation to generation
uoomohsgyz		Both genes in a pair are the same
tnamndio sirtat		Always fully expressed whenever the trait is present
omeleptc noncdiema		One allele is completely dominant over the other alleles
pyecglion		A characteristic that is influenced by many genes
oetpegny		The combination of genes/genetic make up
y hmrcoeoosm		A sex chromosome only present in males
enge		A segment of DNA located on a chromosome
lcmeintope noncdiema		Offspring has a phenotype the is in between that of the parents

What to know for the Mendelian Genetics Test:

Be able to SHOW or DEMONSTRATE your knowledge of:

★ ***Monohybrid crosses (2 x 2 Punnett squares)***
- Assigning allele symbols (letters) for a trait
- Determining the genotypes of parents
- Completing a Punnett square
- Determining genotype percentages and ratios
- Determining phenotype percentages and ratios

★ ***Dihybrid crosses (4 x 4 Punnett squares)***
- Assigning allele symbols (letters)
- Assigning allele symbols (letters) for a trait
- Determining the genotypes of parents
- Completing a Punnett square
- Determining genotype percentages
- Determining phenotype percentages

★ ***Sex-Linked Trait Crosses (2 x 2 Punnet Squares)***
- Assigning allele symbols (letters) for a trait
- Determining the genotypes of parents
- Completing a Punnett square
- Determining genotype percentages and ratios
- Determining phenotype percentages and ratios

★ ***Analyzing pedigrees***
- Assigning genotypes to members of a pedigree
- Determining carriers of a trait

Be able to JUSTIFY your answers to the following concepts:

➔ Genotype predictions

➔ Phenotype predictions

➔ The passing on of sex-linked traits from parents to offspring

➔ Member genotypes from a pedigree

****Know all vocabulary from this unit (but especially the terms on page 5 of this packet...hint hint)****