Genetics Test Review

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Definitions:

Diploid/Haploid - Diploid - full # of chromosomes
Haploid - half #

Allele - different forms of a gene

Homozygous - the same

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Heterozygous - different

Dominant - trait that shows

Recessive - trait does not show

genetic info physical

Genotype/Phenotype -

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Co-Dominance - Both alleles are expressed equally
(AB blood)

Multiple Alleles - There are more than 2 alleles
(A, B, O)

Polygenic Inheritance -
many genes are responsible for expressing a trait
(skin color)

Incomplete Dominance - Heterozygous expression is inbetween dom. & recessive
(Red/white/Pink)

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Epistasis - masking of a gene due to the presence of a gene on a different chromosome (albino)

Test Cross - used to determine an unknown genotype

Law of Dominance - one allele is expressed over the other

Law of Independent Assortment - 2 traits can be expressed seperate from one another

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Law of Segregation -

alleles seperate before being passed on

Mutation -

any change to genetic makeup

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Long Answers:

1. In humans, freckles are dominant to no freckles. Cross a heterozygous freckled male with a non-freckled female and give the genotypic and phenotypic ratios of the F1 generation.

F f

	F	f
f	Ff	ff
f	Ff	ff

Ff x ff

50% Ff → Freckles

50% ff → No Freckles

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2. In gerbils, rough coat is dominant to smooth coat. Cross a heterozygous rough coated gerbil with a smooth coat and give the genotypic and phenotypic ratios of the F1 generation.

	R	r
r	Rr	rr
r	Rr	rr

50% Rr

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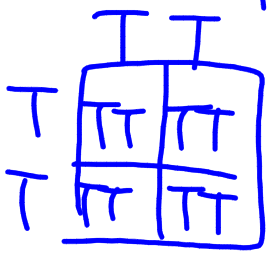
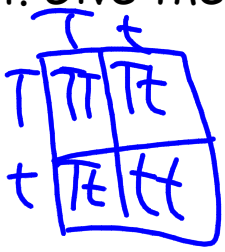
3. What are the chances that two plants that are homozygous tall creating a short plant? Explain your answer. TT x TT



4. Give the genotypic ratios of Tt x Tt.



25% TT
50% Tt
25% tt

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5. In peas, a green pod (G) is dominant to yellow peas (g) while tall plants (T) are dominant to short plants (t). Cross a heterozygous tall green plant with a heterozygous tall, yellow plant. TtGg x Ttgg

	TG	Tg	tG	tg
Tg	TTGg	TTgg	TtGg	Ttgg
Tg	TTGg	TTgg	TtGg	Ttgg
tg	TtGg	Ttgg	ttGg	ttgg
tg	TtGg	Ttgg	ttGg	ttgg

TTGg 2/16
TTgg 2/16
TtGg 4/16
Ttgg 4/16
ttGg 2/16
ttgg 2/16

G+T 6/16
G+S 2/16
Y+T 4/16
Y+S 2/16

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6. You found a wild black mouse. Explain how you would determine the genotype of the mouse. Hint: In mice, white fur is recessive.

BB or Bb

B? 1) Cross with a bb

2) look at offspring
- Recessive trait shows up = Bb
- No recessive trait = BB

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7. In "the Simpsons", yellow hair is dominant to blue hair. Marge Simpson married Homer who is homozygous for yellow hair. A=yellow a=blue

a) What are the genotypes of Bart, Lisa and Maggie?

Aa

b) What if Lisa one day married Millhouse adn they had kids? What would be the genotypic and phenotypic ratios of their children?

Aaxaa

	A	a
a	Aa	aa
a	Aa	aa

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8. In petunias, red flowers are incompletely dominant to white flowers. Cross two pink flowers and give the phenotypic ratios of the F1 generation.

	R	r
R	RR	Rr
r	Rr	rr

25% RR = Red

50% Rr = Pink

25% rr = white

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9. If my blood type was O and my mother's blood type was A could she be my birth mother? Why or why not?

A - AA or AO

B - BB or BO

AB - AB

O - OO

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10. In the 1950's, a young woman sued film star/ director Charlie Chaplin for parental support of her illegitimate child. Charlie Chaplin's blood type was already on record as type AB. The mother of the child had type A and her son had type O.

a) Complete a Punnett square for the possible cross of Charlie and the mother.

	A	B
A	AA	AB
O	AO	BO

	A	B
A	AA	AB
A	AA	AB

b) The judge ruled in favor of the mother and ordered Charlie to pay child support. Was the judge correct in his decision based on blood typing evidence? Explain why or why not?

No, Charlie can only pass on an A or B

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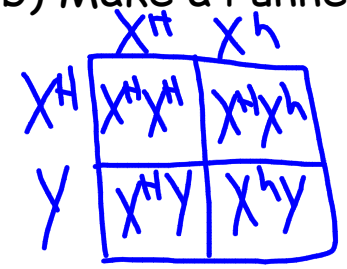
11. Hemophilia is a sex-linked disorder. A person with hemophilia is lacking certain proteins that are necessary for normal blood clotting. A woman who is a carrier for hemophilia marries a normal man.

X^HX^h X^HY

a) What are the genotypes of the parents?

b) Make a Punnett for the above cross.



Females: 50% X^HX^H 50% Normal
50% X^HX^h 50% carriers

Males: 50% X^HY → Normal
50% X^hY → Hemo

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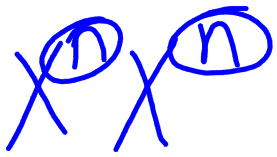
12. Can a color blind female have a son that has normal vision? Color blindness is caused by a sex-linked allele.



Males → have it

females - pass it on

carried on X chromosome

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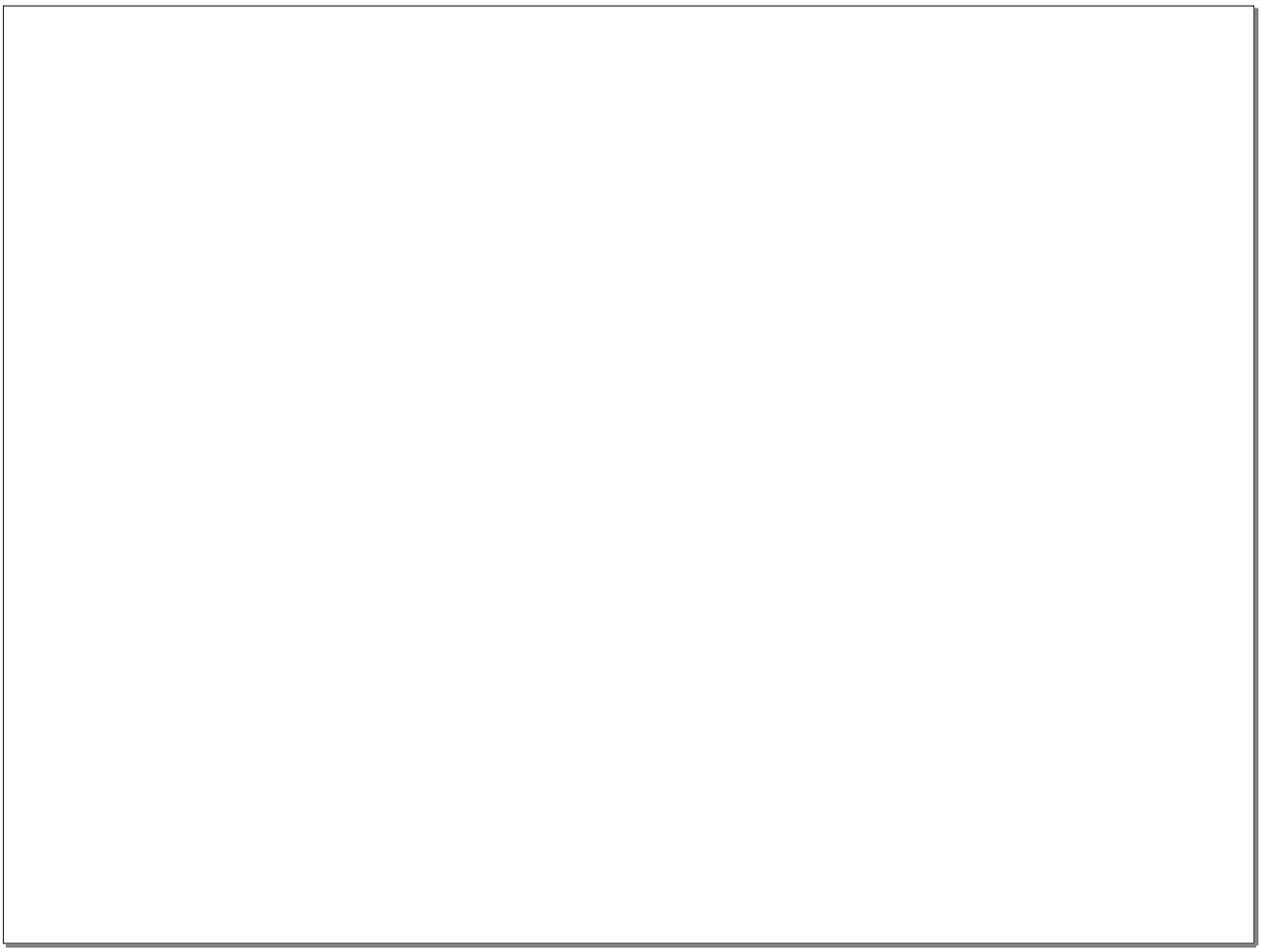

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