BIOL 1107
Probability and Inheritance

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Science Guyz, LLC: 250 W Broad St STE 102 Athens, GA 30601 Phone: 706-552-0777 Email: tutor@scienceguyz.com
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.311 X .285 = 0.088635 = 8.86%

There are three different outcomes possible for the genotype: Tx, Tl, and Ts. These are the three possible alleles for the gene that determines tongue length in flying giraffes. The phenotypes for this trait include the possible outcomes for tongue length that can be expressed by the three possible alleles: very long, long, or short tongues.

a) One parent is heterozygous, one parent is homozygous for normal hemoglobin
b) Both parents are homozygous for sickle cell disorder
c) Both parents are heterozygous for normal hemoglobin
d) Both parents are homozygous
e) None of the above
f) All of the above

Brown eyes: 75% (any with a dominant ‘B’ allele)
Blue eyes: 25% (only those with two recessive ‘b’ alleles)
Heterozygous: 50% (same alleles)
Homozygous: 50% (different alleles)

	B	b
B	BB	Bb
b	Bb	bb

a) 50% yellow, 25% heterozygous green, 25% heterozygous green
b) 50% yellow, 50% green
c) 100% green
d) 50% heterozygous, 50% green
e) 25% heterozygous yellow, 50% homozygous yellow, 50% green

The F1 generation will all be Yy, because homozygous yellow pea plants will necessarily contribute a 'Y' and homozygous green pea plants a 'y'. The Punnett square represents a cross between one of these Yy plants and a green pea plant, which must be yy because green is the recessive gene, so a green pea plant must be homozygous (yy).

	y	y
Y	Yy	Yy
y	yy	yy

Of 16 possibilities, 4 have the genotype HHFf (1st row), and 4 have the genotype HhFf (3rd row). All 8 of those combinations will present the phenotype of long hair (Hh or HH) and non-fire breathing (Ff). 8 divided by 16 gives 0.5, so 50% of F1 generation outcomes would have this phenotype.

	Hf	Hf	Hf	Hf
HF	HHFf	HHFf	HHFf	HHFf
Hf	HHff	HHff	HHff	HHff
hF	HhFf	HhFf	HhFf	HhFf
hf	Hhff	Hhff	Hhff	Hhff

A. What is the probability that parent B will contribute alleles to the zygote for invisibility, short hair, single eye, and fire breathing?

1 x ½ x ½ x ½ = .125 = 12.5%

B. What is the probability that parent A will contribute alleles to the zygote for invisibility, short hair, single eye, and fire breathing?

0 x ½ x 0 x 1 = 0%

C. What is the probability that the offspring of these parents will be invisible, have long hair, breathe fire, and have one eye?

1 x ¾ x 1 x ½ = .375 = 37.5%

Practice: in the second generation, there are/is _____2_____ individual(s) affected by colorblindness. ____2/both_____ of them are female, and _____0/none_____ of them are male. The mother of generation two had __2___ children, and the father has the number __3__ in the chart.

x-linked recessive. It is recessive because we see individuals affected by the disease having two parents that were not affected. Consider the non-founding son that has the disease. Only the mother could be a carrier. The only way for the son to be affected through receiving one allele for the disease is if the allele is on the X-chromosome (bc males only have one).

Because we know that the disease is X-linked, the allele must have come from the mother (males receive a Y chromosome from their father, and an X chromosome from their mother).

It is dominant, because all affected individuals had affected parents. It can't be determined if it is X-linked or autosomal. The only non-founding child with an affected father is a daughter, which could have received the allele on any chromosome from the father, including the X-chromosome (daughters inherit an X sex chromosome from their father, whereas sons receive a Y sex chromosome from their fathers).

