

Sex-Linked Traits Worksheet

Key

1. Albinism is a recessive autosomal genetic disorder that causes the complete or partial absence of pigments in the skin, hair, and eyes. Fill in the Punnett square and determine the expected genotypic ratios from crossing homozygous recessive and heterozygous dominant parents.

	N	n
n	Nn	nn
n	Nn	nn

Genotypes: Nn, nn
 Phenotypes: Normal (carrier), Albino (1:1)
 Genotypic Ratio: 1:1
 % of kids with disorder: 50% % of carrier kids: 50%

2. Red-green color blindness is a recessive sex-linked (X chromosome) genetic disorder where the middle (green) or long (red-yellow) wavelength cones in the eyes have a partial or complete loss of function. Fill in the Punnett square and determine the expected genotypes and phenotypes from crossing a normal male and a female who is a carrier for colorblindness.

	X ^N	X ⁿ
X ^N	X ^N X ^N	X ^N X ⁿ
Y	X ^N Y	X ⁿ Y

Genotypes: X^NX^N, X^NXⁿ, X^NY, XⁿY
 Circle all phenotype(s): normal male, colorblind male, normal female, carrier female, colorblind female
 % of kids with disorder: 25% Gender(s): male / female

3. Fill in the Punnett square for a cross of a male with color blindness with a normal female.

	X ^N	X ⁿ
X ⁿ	X ^N X ⁿ	X ⁿ X ⁿ
Y	X ^N Y	X ⁿ Y

Genotypes: X^NXⁿ, XⁿXⁿ
 Circle all phenotype(s): normal male, colorblind male, normal female, carrier female, colorblind female
 % of kids with disorder: 0% Gender(s): male / female

4. Fill in the Punnett square for a cross of a male who is color blind and a female who is a carrier for colorblindness.

	X ^N	X ⁿ
X ⁿ	X ^N X ⁿ	X ⁿ X ⁿ
Y	X ^N Y	X ⁿ Y

Genotypes: X^NXⁿ, XⁿXⁿ, X^NY, XⁿY
 Circle all phenotype(s): normal male, colorblind male, normal female, carrier female, colorblind female
 % of kids with disorder: 50% Gender(s): male / female

5. Fill in the Punnett square for a cross of a normal male and a female who is colorblind.

	X^n	X^n
X^N	$X^N X^n$	$X^N X^n$
Y	$X^n Y$	$X^n Y$

Genotypes: $X^N X^n, X^n Y$

Circle all phenotype(s): normal male, colorblind male,
normal female, carrier female, colorblind female

% of kids with disorder: 50% Gender(s): male / female

6. Fill in the Punnett square for a cross of a colorblind male and a colorblind female.

	X^n	X^n
X^n	$X^n X^n$	$X^n X^n$
Y	$X^n Y$	$X^n Y$

Genotypes: $X^n X^n$

Circle all phenotype(s): normal male, colorblind male,
normal female, carrier female, colorblind female

% of kids with disorder: 100% Gender(s): male / female

7. Explain how sex-linked traits are different than autosomal traits.

They are on the X-chromosome.

8. Explain why males have more sex-linked disorders than females.

Because they are on the X-chromosome, they are more commonly expressed in males, since males only get one X-chromosome. Males only need one copy of the recessive allele to have the disorder. Females need two.