

Worksheet: Monohybrid Crosses

UNIT 3: GENETICS

Directions: Answer the following genetic cross problems. You can refer to the "Punnett Square Cheat Sheet" attached at the end of this worksheet to help you solve the different types of problems. It is essential that you know all of the vocabulary included in the "cheat sheet" as well. Remember when you are doing a genetic cross to follow the steps below to complete!

STEP 1: Determine what kind of problem you are trying to solve.

STEP 2: Determine letters you will use to specify traits.

STEP 3: Determine parent's genotypes.

STEP 4: Make your Punnett square and make gametes

STEP 5: Complete cross and determine possible offspring.

STEP 6: Determine genotypic and phenotypic ratios.

Single-Factor Crosses (Mono-hybrid)

1. In certain breeds of dogs, deafness is due to a recessive allele (d) of a particular gene, and normal hearing is due to its dominant allele (D). What percentage of the offspring of a normal heterozygous (Dd) dog and a deaf dog (dd) would be expected to have normal hearing? A homozygous deaf dog and a homozygous normal?
2. In man, normal pigmentation is due to a dominant allele (C), and albinism to its recessive allele (c). A normal man marries an albino woman. Their first child is albino. What are the genotypes of these three people? If there are more children, what would they probably be like?
3. In minks, brown is dominant over silver-blue color. What offspring would you predict if you crossed a homozygous brown mink with a silver-blue mink?

8. In humans, acondroplasia "dwarfism" (D) is dominant over normal (d). A homozygous dominant (DD) person dies before the age of one. A heterozygous (Dd) person is dwarfed. A homozygous recessive individual is normal. A heterozygous dwarf man marries a dwarf heterozygous woman. Give the genotypic and phenotypic ratios of the offspring

9. In humans, free earlobes (F) is dominant over attached earlobes (f). If one parent is homozygous dominant for free earlobes, while the other has attached earlobes can they produce any children with attached earlobes? Show punnett square to answer question.

10. In humans widow's peak (W) is dominant over straight hairline (w). A heterozygous man for this trait marries a woman who is also heterozygous. Give the genotypic and phenotypic ratios of the offspring

11. In pea plants, yellow seeds (Y) are dominant and green seeds (y) are recessive. A pea plant with yellow seeds is crossed with a pea plant with green seeds. The resulting offspring have about equal numbers of yellow and green seeded plants. What are the genotypes of the parents?

8. In humans, acondroplasia "dwarfism" (D) is dominant over normal (d). A homozygous dominant (DD) person dies before the age of one. A heterozygous (Dd) person is dwarfed. A homozygous recessive individual is normal. A heterozygous dwarf man marries a dwarf heterozygous woman. Give the genotypic and phenotypic ratios of the offspring

D - dwarf
d - normal
Dd - dwarf
dd - normal
DD - dead before puberty

	D	d
D	DD	Dd
d	Dd	dd

pheno ratio: 3 : 1
dwarf normal

geno ratio: 1 : 2 : 1
homo dw. hetero dw homo norm

9. In humans, free earlobes (F) is dominant over attached earlobes (f). If one parent is homozygous dominant for free earlobes, while the other has attached earlobes can they produce any children with attached earlobes? Show punnett square to answer question.

F - free
f - attached
FF x ff

	F	F
f	Ff	Ff
f	Ff	Ff

pheno ratio: 4 : 0
free attached

No - all offspring will have free earlobes

10. In humans widow's peak (W) is dominant over straight hairline (w). A heterozygous man for this trait marries a woman who is also heterozygous. Give the genotypic and phenotypic ratios of the offspring

W - widow peak
w - straight
Ww x Ww

	W	w
W	WW	Ww
w	Ww	ww

pheno ratio: 3 : 1
wid PK STR

geno ratio: 1 : 2 : 1
homo WP hetero WP homo STR

11. In pea plants, yellow seeds (Y) are dominant and green seeds (y) are recessive. A pea plant with yellow seeds is crossed with a pea plant with green seeds. The resulting offspring have about equal numbers of yellow and green seeded plants. What are the genotypes of the parents?

(TEST)

Y - yellow
y - green

offspring
yellow = green
~ 50 : 50

TWO DOMINANT GENOTYPES
YY or Yy

	Y	y
Y	YY	Yy
y	Yy	yy

100% yellow

	Y	y
Y	Yy	yY
y	yY	yy

1 : 1
yellow green