

# Worksheet: Dihybrid Crosses

## UNIT 3 : GENETICS

**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.

### Two-Factor Crosses (Di-hybrid)

Ex) A tall green pea plant (TTGG) is crossed with a short white pea plant (ttgg).

TT or Tt = tall

tt = short

GG or Gg = green

gg = white

	TG	TG	TG	TG
tg	TtGg	TtGg	TtGg	TtGg
tg	TtGg	TtGg	TtGg	TtGg
tg	TtGg	TtGg	TtGg	TtGg
tg	TtGg	TtGg	TtGg	TtGg

16 Tall/Green : 0 Tall/White : 0 Short/Green : 0 Short/ White

1) A tall green pea plant (TTGg) is crossed with a tall green pea plant (TtGg)

\_\_\_\_\_ X \_\_\_\_\_


Short/Green : \_\_\_\_\_ Short/ White

Tall/Green : \_\_\_\_\_ Tall/White : \_\_\_\_\_

Name \_\_\_\_\_

Period \_\_\_\_\_

2) A tall green pea plant (TtGg) is crossed with a Short white pea plant (ttgg).

\_\_\_\_\_ X \_\_\_\_\_


\_\_\_\_ Tall/Green : \_\_\_\_ Tall/white : \_\_\_\_ short/Green : \_\_\_\_ short/ white

3) A Homozygous tall, green flowered plant is crossed with a Homozygous short white flowered plant.

\_\_\_\_\_ X \_\_\_\_\_


\_\_\_\_ Tall/green : \_\_\_\_ Tall/White : \_\_\_\_ Short/green: \_\_\_\_ Short/White

4) Two Heterozygous Tall, Green pea plants are crossed.

Name \_\_\_\_\_

Period \_\_\_\_\_

\_\_\_\_\_ X \_\_\_\_\_


\_\_\_\_ Tall/Green : \_\_\_\_ Tall/White : \_\_\_\_ Short/Green : \_\_\_\_ Short/ White

1. In man, assume that spotted skin (S) is dominant over non-spotted skin (s) and that wooly hair (W) is dominant over non-wooly hair (w). Cross a marriage between a heterozygous spotted, non-wooly man with a heterozygous wooly-haired, non-spotted woman. Give genotypic and phenotypic ratios of offspring.


2. In horses, black is dependent upon a dominant gene, B, and chestnut upon its recessive allele, b. The trotting gait is due to a dominant gene, T, the pacing gait to its recessive allele, t. If a homozygous black pacer is mated to a homozygous chestnut trotter, what will be the appearance of the F<sub>1</sub> generation?


3. In summer squash, white fruit color (W) is dominant over yellow fruit color (w) and disk-shaped fruit (D) is dominant over sphere-shaped fruit (d).. If a squash plant true-breeding for white, disk-shaped fruit is crossed with a plant true-breeding for yellow, sphere-shaped fruit,

Name \_\_\_\_\_

Period \_\_\_\_\_


5. In mice, the ability to run normally is a dominant trait. Mice with this trait are called running mice (R). The recessive trait causes mice to run in circles only. Mice with this trait are called waltzing mice (r). Hair color is also inherited in mice. Black hair (B) is dominant over brown hair (b). For each of the following problems, determine the parent genotypes, determine possible gametes then construct a Punnet square to solve.

a. Cross a heterozygous running, heterozygous black mouse with a homozygous running, homozygous black mouse

Parental genotypes \_\_\_\_\_

Possible gametes \_\_\_\_\_

Offspring phenotypic ratio \_\_\_\_\_


b. Cross a homozygous running, homozygous black mouse with a heterozygous running, brown mouse

Parental genotypes \_\_\_\_\_

Possible gametes \_\_\_\_\_

Offspring phenotypic ratio \_\_\_\_\_


Name \_\_\_\_\_

Period \_\_\_\_\_

c. Cross a waltzing brown mouse with a waltzing brown mouse

Parental genotypes \_\_\_\_\_

Possible gametes \_\_\_\_\_

Offspring phenotypic ratio \_\_\_\_\_


d. Cross a homozygous running, heterozygous black mouse with a waltzing brown mouse

Parental genotypes \_\_\_\_\_

Possible gametes \_\_\_\_\_

Offspring phenotypic ratio \_\_\_\_\_


e. Cross a heterozygous running, brown mouse with a heterozygous running, homozygous black mouse

Parental genotypes \_\_\_\_\_

Possible gametes \_\_\_\_\_

Offspring phenotypic ratio \_\_\_\_\_


f. Cross a heterozygous running, heterozygous black mouse with a heterozygous running, heterozygous black mouse

Parental genotypes \_\_\_\_\_

Possible gametes \_\_\_\_\_

Offspring phenotypic ratio \_\_\_\_\_


Name \_\_\_\_\_

Period \_\_\_\_\_

1. Set up a punnett square using the following information:

- Dominate allele for tall plants = D
- Recessive allele for dwarf plants = d
- Dominate allele for purple flowers = W
- Recessive allele for white flowers = w
- Cross a homozygous dominate parent (DDWW) with a homozygous recessive parent (ddww)


2. Using the punnett square in question #1:

a. What is the probability of producing tall plants with purple flowers?

Possible genotype(s)?

b. What is the probability of producing dwarf plants with white flowers?

Possible genotype(s)?

c. What is the probability of producing tall plants with white flowers?

Possible genotype(s)?

d. What is the probability of producing dwarf plants with purple flowers?

Possible genotype(s)?

3. Set up a punnett square using the following information:

- Dominate allele for black fur in guinea pigs = B
- Recessive allele for white fur in guinea pigs = b
- Dominate allele for rough fur in guinea pigs = R
- Recessive allele for smooth fur in guinea pigs = r
- Cross a heterozygous parent (BbRr) with a heterozygous parent (BbRr)


4. Using the punnett square in question #3:

a. What is the probability of producing guinea pigs with black, rough fur?

Possible genotype(s)?

b. What is the probability of producing guinea pigs with black, smooth fur?

Possible genotype(s)?

c. What is the probability of producing guinea pigs with white, rough fur?

Possible genotype(s)?

d. What is the probability of producing guinea pigs with white, smooth fur?

Possible genotype(s)?