

TWO TRAIT CROSSES PRACTICE SHEET

1. For each of the following parent genotypes listed below, determine the gametes that parent could produce.

a. AAbb _____

b. DDEE _____

c. DdEe _____

d. aaBb _____

e. aabb _____

f. Ddee _____

2. Use the key below to complete the following chart.

R = red ears
r = white ears

I = two legs
t = one leg

F = frizzy hair
f = straight hair

Genotype	Phenotype
RRtt	
RrTt	
rrtt	
Ffrr	
	red eared with frizzy hair
	white eared with straight hair
	two legged with frizzy hair
	two legged with white ears

3. One the distant planet of Foo-Foo landlives the legendary giant Foo-Foo bird. In these birds LONG feathers are dominant, while SHORT feathers are recessive. PURPLE color is dominant, while PINK color is recessive.

Use the key below to complete the following.

L = long feathers
l = short feathers

P = Purple color
p = pink color



- a. Use a punnett square to show a cross between a homozygous purple, homozygous long-feathered bird with a pink, short-feathered bird.

CROSS _____ X _____

Describe the offspring produced. _____

- b. Use a punnett square to show a cross between two heterozygous individuals.

CROSS _____ X _____

What are the phenotypes of the offspring? _____

- c. Use a punnett square to show a cross between a heterozygous individual and a short-feathered pink bird.

CROSS _____ X _____

What are the phenotypes of the offspring? _____

Step 5 Complete the Punnett square by writing the alleles from the gametes in the appropriate boxes.

The alleles from the gamete above the box and the alleles from the gamete to the side of the box are combined inside each of the boxes. Write the capital letter first for each pair of alleles. The letters inside each box represent the probable genotypes of the offspring resulting from the cross.

	<i>GN</i>	<i>Gn</i>	<i>gN</i>	<i>gn</i>
<i>GN</i>	<i>GGNN</i>	<i>GGNn</i>	<i>GgNN</i>	<i>GgNn</i>
<i>Gn</i>	<i>GGNn</i>	<i>GGnn</i>	<i>GgNn</i>	<i>Ggnn</i>
<i>gN</i>	<i>GgNN</i>	<i>GgNn</i>	<i>ggNN</i>	<i>ggNn</i>
<i>gn</i>	<i>GgNn</i>	<i>Ggnn</i>	<i>ggNn</i>	<i>ggnn</i>

Step 6 Determine the phenotypes of the offspring.

In this example, 9/16 have green smooth pods, 3/16 have yellow smooth pods, 3/16 have green constricted pods, and 1/16 have yellow constricted pods.

Step 7 Using the results of Steps 5 and 6, answer the problem.

Note that in this example, as in many of the genetics problems you will encounter, you are asked for more than just the ratios resulting from the cross. This is one reason why it is important to read genetics problems carefully. In this example, the genotypic ratio is $1/16:2/16:1/16:2/16:4/16:2/16:1/16:2/16:1/16 = 1:2:1:2:4:2:1:2:1$. The phenotypic ratio is $9/16:3/16:3/16:1/16 = 9:3:3:1$. The phenotype of the parent is green smooth pods.

Practice Problems

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, draw a Punnett square in the space provided and fill in the information on the indicated lines.

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

Parental genotypes: _____

Phenotypic ratio: _____

Name _____ Class _____ Date _____

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

Parental genotypes: _____

Phenotypic ratio: _____

3. Cross a waltzing brown mouse with a waltzing brown mouse.

Parental genotypes: _____

Phenotypic ratio: _____

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

Parental genotypes: _____

Phenotypic ratio: _____

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

Parental genotypes: _____

Phenotypic ratio: _____