

**PUNNETT SQUARES WORKSHEET**

**Directions:** Show all your work. Follow the format of the sample problem below when writing your ratios.

**Sample Problem.**

In humans, dimples (D) are dominant over no dimples (d). In a cross between 2 parents heterozygous for dimples, predict the possible genotype and phenotype ratios.

Problem solving strategy: Do the Punnett square first, then use it to figure out your ratios. The possible alleles each parent can contribute to their gametes go on the top and left side of the Punnett square. "Total" them together in the boxes to determine what allele combinations are possible in the offspring.

**Write the phenotypic ratio like this:**

*# dominant phenotype : # recessive phenotype*

**Write the genotypic ratio like this:**

*# dominant genotype : # heterozygous genotype : # recessive genotype*

**Actually write out what the phenotypes or genotypes are. Your work should look like this:**

Phenotypic ratio: 3 dimples : 1 no dimples

Genotypic ratio: 1 DD : 2 Dd : 1 dd

	D	d
D	DD	Dd
d	Dd	dd

- In humans, free earlobes (E) are dominant over attached earlobes (e). In a cross between 2 parents heterozygous for free earlobes, predict the possible genotype and phenotype ratios.

Phenotypic Ratio: \_\_\_\_\_

Genotypic Ratio: \_\_\_\_\_


- Diagram a cross between a homozygous free earlobes individual and a heterozygous free earlobe individual. Indicate the genotype and phenotype ratios of the offspring.

Phenotypic Ratio: \_\_\_\_\_

Genotypic Ratio: \_\_\_\_\_


3. In rabbits, the alleles for black coat color (B) is dominant over the allele for brown coat color (b). Cross a homozygous black rabbit and a heterozygous black rabbit.

Phenotypic Ratio: \_\_\_\_\_

Genotypic Ratio: \_\_\_\_\_


4. Cross a homozygous dominant black rabbit with a homozygous recessive rabbit. What is the phenotype and genotype ratio?

Phenotypic Ratio: \_\_\_\_\_

Genotypic Ratio: \_\_\_\_\_


5. In a test cross, a homozygous recessive parent is crossed with a parent with a dominant phenotype (genotype is unknown—it's either homozygous dominant or heterozygous). Summarize the purpose of a testcross—that is, what will this cross tell you about the parent with the dominant phenotype?  
**(See textbook: Glencoe page 362)**

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Describe what specific results you might obtain in the F1 generation and what specific conclusions you would be able to draw.

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By using two Punnett squares, do a test cross to show how you would determine whether or not the rabbits mentioned in problems 3 and 4 were homozygous black or heterozygous black with regard to coat color.



6. In watermelons, solid green color (G) is dominant over striped pattern (g), and short shape (S) is dominant over long shape (s). Show the cross between a homozygous dominant green, short watermelon with a heterozygous green short watermelon.


What is the genotype ratio? \_\_\_\_\_  
 What is the phenotypic ratio? \_\_\_\_\_

7. Show the cross between GGSS x ggss watermelons.


Plants from the F1 generation in the Punnett square above self pollinate. Show the Punnett square for that cross below.

What is the phenotypic ratio for the F2 generation? \_\_\_\_\_


8. In pea plants, yellow seed coat (Y) is dominant over green (y). Round seed (R) is dominant over wrinkled (r). Diagram a cross between Yyrr and yyRr.

Genotypic ratio \_\_\_\_\_  
 Phenotypic ratio \_\_\_\_\_


9. Incomplete dominance occurs when **both** alleles are expressed in combination: they are neither dominant nor recessive to each other. To show that the alleles have equal dominance, we use capital letters for both alleles, with a ' symbol next to one. For example, T and T' (say "T prime").

Incomplete dominance is seen in **short** tailed cats. These cats have 2 alleles for tail length, T and T'. Cats with long tails have TT. A Manx cat is homozygous for no tail, T'T'. In a cross between a Manx cat and a long-tailed cat, predict the genotype and phenotype of the offspring.

Phenotypic Ratio: \_\_\_\_\_

Genotypic Ratio: \_\_\_\_\_


What will the F 2 generation look like? Show the cross in the Punnett square below.

Phenotypic Ratio: \_\_\_\_\_

Genotypic Ratio: \_\_\_\_\_
