

KEY

Punnett Square Practice Worksheet

Use the following information for questions 1-3:

In dogs, the gene for fur color has two alleles.

The dominant allele (**F**) codes for grey fur and the recessive allele (**f**) codes for black fur.

1) **The female dog is heterozygous. The male dog is homozygous recessive.**

Use a Punnett Square to predict the most likely phenotypic ratio and genotypic ratio of their possible puppies.

♀ Ff × ♂ ff

	f	f	
F	Ff	Ff	Total: 2Ff 2ff
f	ff	ff	

genotypic:  
2Ff:2ff → 1Ff:1ff

phenotypic:  
1 grey:1 black

2) **The female dog has black fur. The male dog has black fur.**

Use a Punnett Square to predict the most likely phenotypic ratio and genotypic ratio of their possible puppies.

♀ ff × ♂ ff

	f	f	
f	ff	ff	Total: 4ff
f	ff	ff	

genotypic:  
all ff

phenotypic:  
all black fur

3) **The female dog is heterozygous. The male dog is heterozygous.**

Use a Punnett Square to predict the most likely phenotypic ratio and genotypic ratio of their possible puppies.

♀ Ff × ♂ Ff

	F	f	
F	FF	Ff	Total: 1FF 2Ff 1ff
f	Ff	ff	

genotypic:  
1FF:2Ff:1ff

phenotypic:  
3 grey:1 black

Use the following information for questions 4-6:

**In fruit flies, red eyes are dominant (E).**

**White-eyes are recessive (e).**

4) A female fly has white eyes, and the male fly is homozygous dominant for red eyes.

Use a Punnett Square to predict the most likely phenotypic ratio and genotypic ratio of their possible offspring.

♀ ee × ♂ EE

	E	E	
e	Ee	Ee	Total: 4Ee
e	Ee	Ee	

genotypic:  
all Ee

phenotypic:  
all red eyes

5) A female and male fly are both homozygous dominant for eye color. Use a Punnett Square to predict the most likely phenotypic ratio and genotypic ratio of their possible offspring.

♀ EE × ♂ EE

	E	E	
E	EE	EE	Total: 4EE
E	EE	EE	

genotypic:

all EE

phenotypic:

all red eyes

6) If both of the parent flies are heterozygous, use a Punnett Square to predict the most likely phenotypic ratio and genotypic ratio of their possible offspring.

♀ Ee × ♂ Ee

	E	e	
E	EE	Ee	Total: 1EE 2Ee 1ee
e	Ee	ee	

genotypic:

1EE:2Ee:1ee

phenotypic:

3 red eyes: 1 white eyes

Use the following for questions 7-11:

In dogs, there is a hereditary deafness caused by a recessive gene, "d." A kennel owner has a male dog (Gilbert) that she wants to use for breeding purposes if possible. Gilbert can hear.

7) What are the two possible genotypes of Gilbert? DD and Dd

8) If the dog's genotype is **Dd**, the owner does not wish to use him for breeding so that the deafness gene will not be passed on. This can be tested by breeding the dog to a deaf female (dd). Draw two Punnett squares to illustrate the two possible crosses between Gilbert and the deaf female using the possible genotypes of Gilbert that you gave in number 7.

Cross 1

♀ dd × ♂ DD

	D	D	
d	Dd	Dd	Total: 4Dd
d	Dd	Dd	

genotypic:  
all Dd

phenotypic:  
all hearing

Cross 2

♀ dd × ♂ Dd

	D	d	
d	Dd	dd	Total: 2Dd 2dd
d	Dd	dd	

genotypic: (reduced from 2Dd:2dd)  
1Dd:1dd

phenotypic:  
1 hearing: 1 deaf

9) In each case from number 8, what percentage of the offspring would be expected to be able to hear? / to be deaf?

Cross 1: 100% hearing.

Cross 2: 50% hearing, 50% deaf

10) How will the owner know the genotype of Gilbert?

Look at results of test-cross. If there are any deaf offspring, Gilbert will be Dd genotype.

11) Using a Punnett square, show how two hearing dogs could produce deaf offspring.

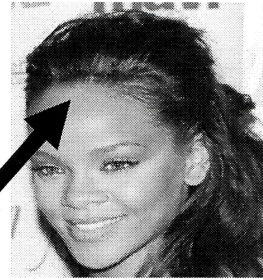
♀ Dd × ♂ Dd

	D	d	
D	DD	Dd	Total: 1DD:2Dd:1dd
d	Dd	dd	

genotypic:  
1DD:2Dd:1dd

phenotypic:  
3 hearing: 1 deaf

Having a widow's peak like Wentworth Miller is dominant. (B)



Not having a widow's peak, like Rihanna, is recessive. (b)

12) If Wentworth Miller is heterozygous for a widow's peak, and he and Rihanna have children, use a Punnett Square to predict the most likely phenotypic ratio and genotypic ratio of their possible children.

♀ bb × ♂ Bb

	B	b	Total:
b	Bb	bb	2 Bb
b	Bb	bb	2 bb

genotypic:

2 Bb : 2 bb ⇒ 1 Bb : 1 bb

phenotypic:

1 widow's peak : 1 no widow's peak

13) Look at the phenotypes of Beyonce and Jay Z. If these two had children, could they have children with a widow's peak? Why or why not? Use a Punnett Square to explain your answer.

No, they could not. Neither has a widow's peak. Their genotypes are "bb". All their children will not have a widow's peak (genotype "bb").

	b	b	Total:
b	bb	bb	4bb
b	bb	bb	<del>4bb</del>

genotypic ratio:  
all bb

phenotypic ratio:  
all "no widow's peak".

