

Complete the following monohybrid crosses: draw a Punnett square, list the ratio and describe the offspring IF INSTRUCTED TO DO SO. Be sure to remember that the capital letter is dominant.

Example)

A green plant (GG) is being crossed with a green plant (Gg).

G	G
GG	GG
Gg	Gg

- 1) A green plant (Gg) is crossed with a yellow plant (gg).

- 2) A tall plant (TT) is crossed with a tall plant (Tt).

- 3) A tall plant (Tt) is crossed with a short plant.

- 4) A red flower (Rr) is crossed with a white flower.

- 5) A white flower (rr) is crossed with a white flower (rr).

- 6) A black chicken (BB) is crossed with a black chicken (Bb).

Complete the following problems. Pick a letter to use. Draw and fill in a Punnett square, and then list the offspring genotypes and phenotypes.

1. A homozygous dominant brown mouse is crossed with a heterozygous brown mouse (tan is the recessive color).

2. Two heterozygous white (brown fur is recessive) rabbits are crossed.

3. Two heterozygous red flowers (white flowers are recessive) are crossed.

4. A homozygous tall plant is crossed with a heterozygous tall plant (short is the recessive size).

5. A heterozygous white rabbit is crossed with a homozygous black rabbit.

6. A heterozygous normal person mates with a Cyclops (one eyed human). "Cyclops" is recessive.

Dihybrid Crosses

In peas, round seed shape (R) is dominant to wrinkled seed shape (r), and yellow seed color (Y) is dominant to green seed color (y). A pea plant which is homozygous round seed and has green seed color is crossed with a pea plant that is heterozygous round seed shape and heterozygous yellow seed color. Determine the offspring expected when two pea plants, each heterozygous for seed shape and seed color, are crossed.

Parents:	RRyy	X	RrYy
Gametes:	Ry		RY
	Ry		Ry
	Ry		rY
	Ry		ry

	RY	Ry	rY	ry
Ry				
Ry				
Ry				
Ry				

- 1 What are the chances of the offspring being homozygous for round seed?
- 2 What are the chances of the offspring being homozygous for wrinkled seed?
- 3 What are the chances of the offspring being homozygous for yellow seed color?
- 4 What are the chances of the offspring being homozygous for green seed color?
- 5 What are the chances of the offspring being heterozygous for both seed shape and color? Why?
- 6 What is the genotypic ratio?
- 7 What is the phenotypic ratio?

In FRUIT FLIES, WINGS (N) are dominant to WINGLESS (n) and RED EYES (R) are dominant to WHITE EYES (r). A fly which is homozygous winged and has white eyes is crossed with a fly that is heterozygous winged and heterozygous red eyed. Determine the offspring expected when two flies reproduce.

Parents:	_____ X _____								
Gametes:	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">_____</td> <td style="width: 50%; border: none;">_____</td> </tr> <tr> <td style="border: none;">_____</td> <td style="border: none;">_____</td> </tr> <tr> <td style="border: none;">_____</td> <td style="border: none;">_____</td> </tr> <tr> <td style="border: none;">_____</td> <td style="border: none;">_____</td> </tr> </table>	_____	_____	_____	_____	_____	_____	_____	_____
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_____	_____								
_____	_____								
_____	_____								

- 8 What are the chances of the offspring being homozygous for WINGS?
- 9 What are the chances of the offspring being homozygous for WINGLESS?
- 10 What are the chances of the offspring being homozygous for RED EYES?
- 11 What are the chances of the offspring being homozygous for WHITE EYES?
- 12 What are the chances of the offspring being heterozygous for both traits? Why?
- 13 What is the genotypic ratio?
- 14 What is the phenotypic ratio?

A purebred wingless red-eyed fruit fly is crossed with a purebred winged white-eyed fruit fly. What is the genotype of the offspring? (Hint: They should all be the same so don't do an entire dihybrid cross to answer this)

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Two of the F₁ flies (answer from above) are mated to produce an F₂ generation of flies. What is the *phenotypic* ratio of the F₂ flies? You can do the cross below. Be sure to list the phenotypes after you've completed the cross:

Phenotypes:

In HORSES, HORNLESS (H) are dominant to UNICORN (h) and FLIGHTLESS (F) is dominant to WINGED (f). On night, a flying unicorn swoops in and mates with one of Farmer McDonald's normal horses (which happen to be heterozygous for both traits). Perform the cross below:

Parents:	_____ X _____								
Gametes:	<table style="width: 100%; border: none;"> <tr> <td style="border: none; width: 50%; text-align: center;">_____</td> <td style="border: none; width: 50%; text-align: center;">_____</td> </tr> <tr> <td style="border: none; text-align: center;">_____</td> <td style="border: none; text-align: center;">_____</td> </tr> <tr> <td style="border: none; text-align: center;">_____</td> <td style="border: none; text-align: center;">_____</td> </tr> <tr> <td style="border: none; text-align: center;">_____</td> <td style="border: none; text-align: center;">_____</td> </tr> </table>	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____								
_____	_____								
_____	_____								
_____	_____								



- 15 What are the chances of the offspring being heterozygous for HORNLESS?
- 16 What are the chances of the offspring being homozygous for UNICORN?
- 17 What are the chances of the offspring being heterozygous for FLIGHTLESS?
- 18 What are the chances of the offspring being homozygous for WINGED?

- 19 About a week after birth, flying horses can take to the air. How is a fence supposed to keep a flying horse contained? It can't! How many offspring will actually stick around?

- 20 Unicorns are dangerous! They've got a huge horn and it's pointy. They will have to be separated from the normal horses. Farmer McDonald will have to build a new pen for the unicorns. How many animals will go in this new pen? Be careful (The flying unicorns are going to fly away!).