

# How Solve a Monohybrid Punnett Square Problem \*

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## Read the problem carefully!

### Problem

Cross a pure black guinea pig with a white guinea pig, show all results clearly



- The problem tells you that only one trait is involved and it is black and white
- The letter for black is B ( you need to know this)
- Black guinea pigs can be either:
  - BB (homozygous dominant – also known as PURE or
  - Bb (heterozygous also known as hybrid)
- White guinea pigs are always bb (homozygous recessive)

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## There are six steps to almost all Dominant/Recessive Punnett Squares\*

1. Write the cross (shows genotypes of parents)
2. Make the Punnett square
3. List the phenotypes
4. Give phenotypic ratio (must equal 4) \*
5. List genotypes
6. Give genotypic ratio (must equal 4)

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## Step 1 - Write the cross

### Problem

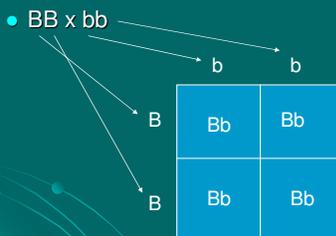
Cross a pure black guinea pig with a white guinea pig, show all results clearly

pure black = homozygous dominant = BB  
white = homozygous recessive = bb

cross = **BB x bb**

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## Step 2 – Make Punnett Square



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## Step 3 – List phenotypes

- There can be only two phenotypes in a black white guinea pig cross: black and/or white
- In the Punnett square to the right there are 4 black guinea pigs (Bb) so for phenotypes you would write:

	b	b
B	Bb	Bb
B	Bb	Bb

**Phenotypes - black**

**do not write white** because none of the offspring have bb which would make them white

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## Step 4 – Give Phenotypic ratio \*

- For phenotypes you should remember that you correctly wrote black in step 4
- To give the phenotypic ratio you need to ask "How many have the dominant phenotype (black) and how many have the recessive trait (white)?"

	b	b
B	Bb	Bb
B	Bb	Bb

dominant = 4      recessive = 0

**Phenotypic ratio is 4:0** \* Your answer should total 4

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## Step 5 – List Genotypes

- The possible genotypes are:
  - homozygous dominant (BB)
  - heterozygous (Bb)
  - homozygous recessive (bb)
- You have only heterozygous offspring in the Punnett square so:

	b	b
B	Bb	Bb
B	Bb	Bb

**Genotypes – heterozygous**

- You cannot list genotypes that are not found in the Punnett square!

**Hint: always list them in the order**  
 1<sup>st</sup> homozygous dominant (BB)  
 2<sup>nd</sup> heterozygous (Bb)  
 3<sup>rd</sup> homozygous recessive (bb)

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## Step 6 – Give genotypic ratios

- To determine genotypic ratios answer these 3 questions:
  - How many homozygous dominant (BB)?
  - How many heterozygous (Bb)?
  - How many homozygous recessive (bb)?

	b	b
B	Bb	Bb
B	Bb	Bb

**Genotypic ratio – 0:4:0** Your answer should total 4

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