

"Bloody Punnett Squares!!!"

Name: _____

Period: _____

Background Information: There are two factors that are typically reported for blood type: **ABO type** and **Rh factor**. For example, blood type **A⁺** or **AB⁻**. Each factor is determined by a separate gene. Blood type genotypes and phenotypes are listed in the table to the right. For example, the blood phenotype **A** has two possible genotypes: $I^A I^A$ and $I^A i$. The blood phenotype Rh negative has one genotype $Rh^- Rh^-$. Often, the two factors are reported together such as blood phenotype **AB⁻**. When the two traits are reported together, the genotypes get a bit more complicated. For example, the genotype for **AB⁻** is $I^A I^B Rh^- Rh^-$. Whereas the phenotype **A⁺** has several possible genotypes: $I^A i Rh^+ Rh^-$ or $I^A i Rh^+ Rh^+$ or $I^A I^A Rh^+ Rh^-$ or $I^A I^A Rh^+ Rh^+$. Use the information in the table to the right to help you solve the 'bloody' problems.

<u>Genotypes</u>	<u>Phenotypes</u>
$I^A I^A$	Type A
$I^A i$	Type A
$I^B I^B$	Type B
$I^B i$	Type B
$I^A I^B$	Type AB
ii	Type O
$Rh^+ Rh^+$	+
$Rh^+ Rh^-$	+
$Rh^- Rh^-$	-

**** Notice: According to the symbols used in the table to the right, the allele for blood type 'O' is recessive to the alleles for both 'A' and 'B' blood types.**

1. Tracy has a blood type of AB and her husband, Trevor, also has a blood type of AB. What are the possible blood types of their children? Make a Punnett Square and summarize the phenotypic percentages!!!

2. Michelle was curious about her mother's blood type. Michelle knew that her own blood type was O, her father's blood type was A, and her two sisters and one brother both also had type A blood. How could Michelle have type O when everyone else around her seems to have type A blood? Michelle is really frustrated. Please help her out by making a possible Punnett square showing how this could happen.

3. John's father has type AB blood and his mother has type O blood. What are the possible blood types that John could have?

4. In the LTHS science department's main office, we found a note from a student that read:

Dear ANYONE!

Could you please help me? I have a question that is honestly NOT a homework question. I am a Junior here at LTHS. "Could a man with type B blood and a woman with type AB produce a child with type O blood?" I think not, because type O is recessive, and the B's seem to be dominant. My cousin thinks yes. Thank you for your help. -- Vicki

Solve this problem. Don't just answer but back up your answer with the appropriate Punnett Squares! You should show at least two Punnett Squares to prove your point!!

5. Trish has type B blood and her son, Tomas, has type AB. What is the blood type of Trish's husband?? List all possibilities and make a Punnett Square to show your work.

6. Identify all of the genotypes possible for the following phenotypes:

O- _____
AB+ _____
B- _____

7. A person with type AB blood that is heterozygous for the Rh factor has children with a person with type O blood that is Rh negative.

a. What are the genotypes of parents? _____ x _____

b. Punnett Square:

c. What is the phenotypic ratio of the children? _____

8. What is the mode of inheritance for the ABO blood type (A, B, O, AB)? _____

9. What is the mode of inheritance for Rh factor (+, -)? _____