

Codominance Worksheet (Blood types)

Name KEY

Human blood types are determined by genes that follow the CODOMINANCE pattern of inheritance. There are two dominant alleles (I^A and I^B) and one recessive allele (i).

Blood Type (Phenotype)	Genotype	Can donate blood to:	Can receive blood from:
O	ii	A,B,AB and O (universal donor)	O
AB	$I^A I^B$	O, AB	A,B,AB and O (universal receiver)
A	$I^A I^A$ or $I^A i$	AB, A	O,A
B	$I^B I^B$ or $I^B i$	AB,B	O,B

1. Write the genotype for each person based on the description:

- Homozygous for the "B" allele
- Heterozygous for the "A" allele
- Type O
- Type "A" and had a type "O" parent
- Type "AB"
- Blood can be donated to anybody
- Can only get blood from a type "O" donor

$I^B I^B$
 $I^A i$
 ii
 $I^A i$
 $I^A I^B$
 ii
 ii

2. Pretend that Brad Pitt is homozygous for the type B allele, and Angelina Jolie is type "O." What are all the possible blood types of their baby?

Brad $I^B I^B$
 Angelina ii

	i	i
I^B	$I^B i$	$I^B i$
I^B	$I^B i$	$I^B i$

possible blood type - B

3. Draw a Punnett square showing all the possible blood types for the offspring produced by a type "O" mother and an a Type "AB" father

	i	i
I^A	$I^A i$	$I^A i$
I^B	$I^B i$	$I^B i$

4. Mrs. Clink is type "A" and Mr. Clink is type "O." They have three children named Matthew, Mark, and Luke. Mark is type "O," Matthew is type "A," and Luke is type "AB." Based on this information:

- Mr. Clink must have the genotype ii
- Mrs. Clink must have the genotype $I^A i$ because Mark has blood type O
- Luke cannot be the child of these parents because neither parent has the allele I^B .

5. Two parents think their baby was switched at the hospital. Its 1968, so DNA fingerprinting technology does not exist yet. The mother has blood type "O," the father has blood type "AB," and the baby has blood type "B."

- Mother's genotype: ii
- Father's genotype: $I^A I^B$
- Baby's genotype: $I^B I^B$ or $I^B i$

d. Punnett square showing all possible genotypes for children produced by this couple

	I^A	I^B
i	$I^A i$	$I^B i$
i	$I^A i$	$I^B i$

e. Was the baby switched? **NO**

6. Two other parents think their baby was switched at the hospital. The mother has blood type "A," the father has blood type "B," and the baby has blood type "AB."

a. Mother's genotype: $I^A I^A$ or $I^A i$

b. Father's genotype: $I^B I^B$ or $I^B i$

c. Baby's genotype: $I^A I^B$

d. Punnett square that shows the baby's genotype as a possibility

	I^B	I^B		I^B	I^B		I^B	i
I^A	$I^A I^B$	$I^A I^B$	I^A	$I^A I^B$	$I^A i$	I^A	$I^A I^B$	$I^A i$
I^A	$I^A I^B$	$I^A I^B$	I^A	$I^A I^B$	$I^A i$	i	$I^B i$	$i i$

e. Was the baby switched? **NO**

7. Based on the information in this table, which man **could not** be the father of the baby? Justify your answer with a Punnett square.

Name	Blood Type
Mother	Type A
Baby	Type B
Sammy the player	Type O
George the sleeze	Type AB
The waiter	Type A
The cable guy	Type B

Type O + Type A \rightarrow

	i	i
I^A	$I^A i$	$I^A i$
I^A	$I^A i$	$I^A i$

	I^A	I^A
I^A	$I^A I^A$	$I^A I^A$
I^A	$I^A I^A$	$I^A I^A$

	i	i
I^A	$I^A i$	$I^A i$
i	$i i$	$i i$

	I^A	i
I^A	$I^A I^A$	$I^A i$
i	$I^A i$	$i i$

8. Based on the information in this table, which man **could not** be the father of the baby? Justify your answer with a Punnett square.

Name	Blood Type
Mother	Type B
Baby	Type AB
Bartender	Type O
Guy at the club	Type AB
Cabdriver	Type A
Flight attendant	Type B

Type O + Type B \rightarrow

	i	i
I^B	$I^B i$	$I^B i$
I^B	$I^B i$	$I^B i$

	I^B	I^B
I^B	$I^B I^B$	$I^B I^B$
I^B	$I^B I^B$	$I^B I^B$

	i	i
I^B	$I^B i$	$I^B i$
i	$i i$	$i i$

	I^B	i
I^B	$I^B I^B$	$I^B i$
i	$I^B i$	$i i$

9. Explain why blood type data cannot prove who the father of a baby is, and can only prove who the father is not.

Blood type data can eliminate because the baby gets 1 allele from mom + 1 allele from dad.