Name: KEY **Date:** _____

Genetics Practice 7: Patterns of Inheritance

In human hair, texture is an example of incomplete dominance.

HH= Curly Hair Hh= Wavy hair hh= straight hair

1. A curly haired father and wavy haired mother have offspring. What are the offspring's genotypes and phenotypes? HH x Hh

   offspring = HH or Hh - curly or wavy (respectively).

2. If a mother has straight hair and the father has wavy hair, is it possible for their son to have curly hair? Use a Punnett square to as proof of your answer.

No - curly hair requires two H alleles.

	H	h
h	Hh	hh
h	Hh	hh

	Eye Color	Hair Type	Blood Type
Mom	Brown (heterozygous)	Wavy	O
Dad	Blue	Straight	B (homozygous)
Ray	Brown (heterozygous)	Straight	AB
Steve	Blue	Curly	B (heterozygous)
Mike	Brown (heterozygous)	Wavy	B

Use the above table to complete the Punnett squares below.

3. Cross Mom and Dad for all 3 traits. Assume that eye color follows simple inheritance with only two alleles.

	B	b
b	Bb	bb
b	Bb	bb

Eye Color

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

Blood Type

	H	h
h	Hh	hh
h	Hh	hh

Hair Type

4. Identify which male is the son of Mom and Dad. Explain your choice.

Ray is out on blood type.
Steve is out on hair type.
Mike is the son.

5. Mrs. Savant is blood type A and Mr. Savant is blood type O. They have three children named Anthony, Walter, and Patrice. Anthony is type O, Walter is type A, and Patrice is type AB.

   a. Mr. Savant must have the genotype ii.

   b. Mrs. Savant must have the genotype $I^A i$ because Anthony has blood type O.

   c. Which child can't be related to Mr. and Mrs. Savant?

Patrice - neither parent has a B allele.

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Genetics Practice 7: Patterns of Inheritance

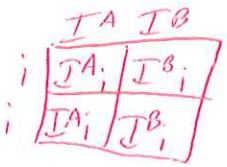
6. The year is 1968. DNA fingerprinting technology does not yet exist. Two parents think their baby was switched at the hospital. The mother has blood type O, the father has blood type AB, and the baby has blood type B.

   a. Mother's genotype: ii

   b. Father's genotype: I^AI^B

   c. Baby's genotype: I^Bi or I^BI^B

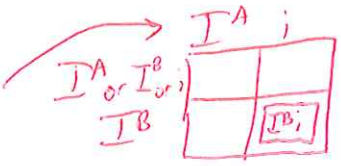
   d. Punnett square showing all possible genotypes for children produced by this couple:



The baby may not have been switched.

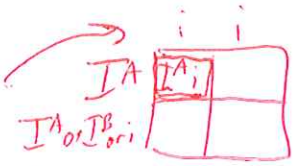
7. Imagine a paternity suit (lawsuit regarding the father of a baby). Based on the information in the table below, which men **could not** be the father of the baby? Justify your answer with a Punnett square.

Name	Blood Type
Mother	Type A I^Ai
Baby	Type B I^Bi
François the Egomaniac	Type O
George the Sleazebag	Type AB
Wanda the Poorly-Named	Type A
Dr. Perfect	Type B



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

Name	Blood Type
Mother	Type O ii
Baby	Type A I^Ai
Julio the Sheep-Shearer	Type O
Wallace the Unemployed	Type AB
Sylvester the Chair	Type A
Gaëtan the Flight Attendant	Type B



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

Nothing about a blood type is unique to an individual however, incompatibility can rule out a potential father if a necessary allele is missing.