Punnett Squares Practice Packet

Most genetic traits have a stronger, dominant allele and a weaker, recessive allele. In an individual with a heterozygous genotype, the dominant allele shows up in the offspring and the recessive allele gets covered up and doesn't show; we call this **complete dominance**. However, some alleles don't completely dominate others. In fact, some heterozygous genotypes allow both alleles to partially show by blending together how they are expressed; this is called **incomplete dominance**. Other heterozygous genotypes allow both alleles to be completely expressed at the same time like spots or stripes; this is called **codominance**.

Examples of each are listed below.

Write what each type would be if they were heterozygous. Show work below.

1. Complete dominance = If a Red (RR) and White flower (rr) were crossbred, resulting in 100% Rr, what phenotype would been seen according to the rules of COMPLETE dominance?

2. Incomplete dominance = If a Red (RR) and White flower (rr) were crossbred, resulting in 100% Rr, what phenotype(s) would been seen according to the rules of IN-complete dominance?

3. Codominance = If a Red (RR) and White flower (WW) were crossbred, resulting in 100% RW, what phenotype(s) would been seen according to the rules of CO-dominance?

Incomplete dominance practice Problems

4-6. Snapdragons are incompletely dominant for color; they have phenotypes red, pink, or white. The red flowers are homozygous dominant, the white flowers are homozygous recessive, and the pink flowers are heterozygous. Give the genotypes for each of the phenotypes, using the letters "R" and " r " for alleles:

a. Red snapdragon genotype: _____

b. Pink snapdragon genotype: _____

c. White snapdragon genotype: _____

Show genetic crosses between the following snapdragon parents, using the punnett squares provided, and record the genotypic and phenotypic %s below:

a. pink x pink

Genotypic %: _____

Phenotypic %: _____

b. red x white

Genotypic %: _____

Phenotypic %: _____

c. pink x white

Genotypic %: _____

Phenotypic %: _____

7-9. In horses, some of the genes for hair color are incompletely dominant. Genotypes are as follows: brown horses are BB, white horses are bb and a Bb genotype creates a yellow-tannish colored horse with a white mane and tail, which is called "palomino". Show the genetic crosses between the following horses and record the genotypic and phenotypic percentages:

a. brown x white

Genotypic %: _____

Phenotypic %: _____

b. brown x palomino

Genotypic %: _____

Phenotypic %: _____

c. palomino x palomino

Genotypic %: _____

Phenotypic %: _____

10. Can palominos be considered a purebred line of horses? Why or why not?

11. Which two colors of horse would you want to breed if you wanted to produce the maximum numbers of palominos in the shortest amount of time?

Codominance Worksheet (Blood types)

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

Blood Type (Phenotype)	Genotype	Can donate blood to:	Can receive blood from:
O	ii (OO)	A,B,AB and O (universal donor)	O
AB	I^AI^B	AB	A,B,AB and O (universal receiver)
A	I^AI^A or I^Ai (I^AO)	AB, A	O,A
B	I^BI^B or I^Bi (I^BO)	AB,B	O,B

1. Write the genotype for each person based on the description:
   a. Homozygous for the "B" allele _____
   b. Heterozygous for the "A" allele _____
   c. Type O _____
   d. Type "A" and had a type "O" parent _____
   e. Type "AB" _____
   f. Blood can be donated to anybody _____
   g. Can only get blood from a type "O" donor _____

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?***(Do the punnett square)*

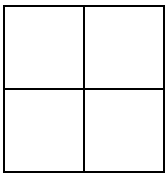
   _____

3. Complete the punnett square showing all the possible blood types for the offspring produced by a type "O" mother and an a Type "AB" father. **What are percentages of each offspring?**

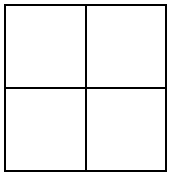
   _____

4. Mrs. Brown is type "A" and Mr. Brown 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:
   a. Mr. Brown must have the genotype _____
   b. Mrs. Brown must have the genotype _____ because _____ has blood type _____
   c. Luke cannot be the child of these parents because neither parent has the allele _____.

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."
   a. Mother's genotype: _____
   b. Father's genotype: _____
   c. Baby's genotype: _____ or _____
   d. Punnett square showing all possible genotypes for children produced by this couple.
   e. Was the baby switched? _____



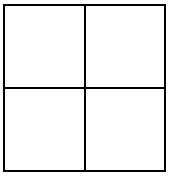
6. Two other parents think their baby was switched at the hospital. Amy the mother has blood type "A," Steven the father has blood type "B," andPriscilla the baby has blood type "AB."
   a. Mother's genotype: _____ or _____
   b. Father's genotype: _____ or _____
   c. Baby's genotype: _____
   d. Punnett square that shows the baby's genotype as a possibility
   e. Could the baby actually be theirs? _____



7. Based on the information in this table, which men **<u>could not</u>** be the father of the baby?

   You can use the Punnett square if you need help figuring it out.

Name	Blood Type
Mother	Type A
Baby	Type B
The mailman	Type O
The butcher	TypeAB
The waiter	Type A
The cable guy	Type B



8. The sister of the mom above also had issues with finding out who the father of her baby was. She had the state take a blood test of potential fathers. Based on the information in this table, why was the baby taken away by the state after the test?

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