**Codominance Practice**

**Incomplete Dominance and Codominance Problems**

1. In some cats, the gene for tail length shows incomplete dominance. Cats with long tails are homozygous (TL TL), and cats with no tails are also homozygous (TN TN). Cats with one long tail allele and one no tail allele have short tails (TL TN).

a. Show the possible offspring of a cross between a long tail cat and a short tail cat. Draw a punnett square and find the genotype ratio and phenotype ratio.

b. Show the possible offspring of two short tail cats. Draw a punnett square and find the genotype and phenotype ratio.

2. In snapdragons, flower color shows incomplete dominance. Red (CP) and white (CW) flowered plants are homozygous, while heterozygous plants have pink (CP CW) flowers.

Show the possible offspring of a cross between a pink flowered plant and a white flowered plant. Give the genotype and phenotype ratios of the predicted offspring.

3. The so-called “blue” (CB CW) Andalusian variety of chicken is produced by a cross between black (CB) and white (CW) varieties. The single pair of alleles involved shows incomplete dominance.

a. What phenotype ratio would you expect in a cross of two “blue” chickens? Show your punnett square.

b. What genotype and phenotype ratio would you expect in a cross between a black chicken and blue chicken? Show your punnett square.

**Sex-Linked Genes**

4. A woman who is heterozygous for hemophilia marries a normal man. What genotypes and phenotypes are possible in their children? Show your punnett square.

5. A woman who is a carrier for hemophilia marries a hemophiliac man. What are the possible genotypes and phenotypes of their children? What is the probability that their son will have hemophilia?

6. What is the probability that a color-blind woman marries a man with normal vision will have a color-blind boy?

**Blood Type**

|  |  |  |  |
| --- | --- | --- | --- |
| **Blood Type**  **(Phenotype)** | **Genotype** | **Can donate blood to:** | **Can receive blood from:** |
| O | ii | A, B, AB, and O (universal donor) | O |
| AB | IA IB | AB | A, B, AB, and O (universal receiver) |
| A | IA IA or IAi | AB, A | O, A |
| B | IB IB or IBi | AB, B | O, B |

7. 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 \_\_\_\_\_\_\_\_

8. 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?

9. Draw a punnett square showing all the possible blood types for the offspring produced by a type “O” mother and a type “AB” father.

10. 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:

a. Mr. Clink must have the genotype \_\_\_\_\_\_\_.

b. Mrs. Clink must have the genotype \_\_\_\_\_\_\_ because \_\_\_\_\_\_\_ has blood type \_\_\_\_\_\_\_.

c. Luke cannot be the child of these parents because neither parent has the allele \_\_\_\_\_\_\_.

11. Two 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: \_\_\_\_\_\_\_ or \_\_\_\_\_\_\_

b. Father’s genotype” \_\_\_\_\_\_\_ or \_\_\_\_\_\_\_

c. Baby’s genotype: \_\_\_\_\_\_\_\_

d. Punnett squares that show the baby’s genotype as a possibility:

12. 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 A |
| Baby | Type B |
| Sammy the player | Type O |
| George the sleeze | Type AB |
| The waiter | Type A |
| The cable guy | Type B |