**Bio 9: Unit 6 Genetics – Codominance & Blood Type Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. The system of letters for showing flower color in snapdragon flowers uses a prefix **C**, which refers to the gene that codes for flower color, plus a superscript which refers to the specific color, **R** (red) or **W** (white). So the alleles for codominant flower color are: **CR** for red flowers and  **CW** for white flowers.

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The genotypes and their phenotypes are:

* **CRCR** makes red flowers
* **CWCW** makes white flowers
* **CRCW** makes pink flowers
1. Predict the phenotypic ratios of offspring when a

homozygous red flower is crossed with the codominant pink flower.

1. The system of letters for showing fur color in cattle uses a prefix **F**, which refers to the gene that codes for the fur color, plus a super script which refers to the specific color, **R** (red) or **W** (white). So the alleles for codominant fur color are: **FR** for red fur and **FW** for white fur.

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The genotypes and their phenotypes are:

* **FRFR** makes red fur color
* **FWFW** makes white fur color
* **FRFW** makes “Roan” or red and white hairs together
1. Predict the phenotypic ratios of offspring when a

homozygous red fur cattle crosses with a homozygous white fur cattle.

1. What should the genotypes and phenotypes for the

 parent cattle be if a farmer wants only cattle with red fur?

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1. The system of letters for showing fur color in cats uses the prefix **C**, which refers to the gene that codes for the fur color, plus a superscript which refers to the specific color, **B** (black) or **T** (tan). So the alleles for codominant fur color are: **CB** for black fur and **CT** for tan fur.

The genotypes and their phenotypes are:

* **CBCB** makes black fur color
* **CTCT** makes tan fur color
* **CBCT** makes “tabby” or black and tan hairs together
1. What percent of kittens would have a tan fur

phenotype if a tabby cat is crossed with a black cat?

**Blood Types --** ABO blood type in humans is determined by three alleles: Iᴬ, Iᴮ and i. Iᴬ and Iᴮ are codominant alleles. Both Iᴬ and Iᴮ are dominant to the allele i. Four possible phenotypes of ABO blood types- A, B, AB, and O- are possible when these alleles are combined. The genotypes and phenotypes for each blood type are summarized in the table at right. Using this information, give a possible solution for the following problem.

**1. Problem:** Four newborn babies in the delivery room of the hospital at the same time were mixed up by the nurse who attached to wristbands. The blood types of the four babies are known to be AB, O, A, and B. How did the doctors find out which baby belongs to which set of parents? Parents #1 had blood types O and AB; parents #2 had blood types AB and B; parents #3 both had blood types O; parents #4 had blood types O and A.Use Punnett Squares to determine possible genotypes of offspring. Then write the parents of each baby.

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| **Genotypes** | **Blood Types** |
| IᴬIᴬ | A |
| Iᴬi | A |
| IᴮIᴮ | B |
| Iᴮi | B |
| IᴬIᴮ | AB |
| ii | O |





1. Baby with type AB blood\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Baby with type B blood\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Baby with type A blood\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Baby with type O blood\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Using Punnett squares, determine the possible blood types of the offspring when:***

1. Father is type O, Mother is type O

\_\_\_\_\_% O \_\_\_\_\_% A \_\_\_\_\_% B \_\_\_\_\_% AB



1. Father is type O, Mother is type AB

\_\_\_\_\_% O \_\_\_\_\_% A \_\_\_\_\_% B \_\_\_\_\_% AB

1. Father is type A, homozygous, Mother is type B, homozygous

\_\_\_\_\_% O \_\_\_\_\_% A \_\_\_\_\_% B \_\_\_\_\_% AB



1. Father and Mother are both type AB

\_\_\_\_\_% O \_\_\_\_\_% A \_\_\_\_\_% B \_\_\_\_\_% AB



1. Father is type A, heterozygous, Mother is type B, heterozygous

\_\_\_\_\_% O \_\_\_\_\_% A \_\_\_\_\_% B \_\_\_\_\_% AB

**Key:**

|  |  |  |
| --- | --- | --- |
|  | **CR** | **CR** |
| **CR** | CRCR | CRCR |
| **CW** | CRCW | CRCW |

1. a)

 50% or ½ Red flowers

 50% or ½ Pink Flowers

|  |  |  |
| --- | --- | --- |
|  | **FR** | **FR** |
| **FW** | FRFW | FRFW |
| **FW** | FRFW | FRFW |

2. a)

 100% or 4/4 “Roan”

|  |  |  |
| --- | --- | --- |
|  | **FR** | **FR** |
| **FR** | FRFR | FRFR |
| **FR** | FRFR | FRFR |

b)

Genotype: FRFR x FRFR

Phenotype: Red fur cattle x Red fur cattle

|  |  |  |
| --- | --- | --- |
|  | **CB** | **CT** |
| **CB** | CBCB | CTCB |
| **CB** | CBCB | CTCB |

3. a)

0% of kittens will have a tan phenotype.