# Genetics Review Sheet

You are employed by Genes R Us as a genetics lab technician to create a new breed of dog. You’re given the following information from previous research.

* Black coat (B) is dominant over brown coat (b)
* Spotted coat (T) is dominant over solid coat (t)
* Tall legs (L) and short legs (S) are examples of incomplete dominance
* Immunity to heart worms for dogs is sex linked (Xh)
* Blood type is like that in humans: A type (IA or IAi), B type (IB or IBi), AB type (IAIB), and O type (ii): AB is the universal receiver (can receive blood from al other types) and O type is the universal donor (can give blood to all other types)

Using the information to the right, solve the following problems.

1. Write the genotypes for the following:
	1. Heterozygous black coat: Bb
	2. Homozygous spotted coat: TT
	3. Medium legs: TT’
	4. Male with immunity to heart worms: XhY
2. Draw a cross between two spotted puppies that would produce solid puppies: Tt x Tt

T t

|  |  |
| --- | --- |
|  TT | Tt |
|  Tt | tt |

T

t

1. What is the phenotypic ratio (Spotted:solid) of a cross between a heterozygous black puppy and a brown puppy? Draw the Punnett square.

|  |  |  |
| --- | --- | --- |
|  | T | t |
| t | Tt | tt |
|  t | Tt | tt |

50% Spotted 50% brown

1. A male with immunity to heart worms is mated with a female. They have only puppies (male and female) with immunity to heart worms. What must be the genotype of the female? Draw the Punnett square.

|  |  |  |
| --- | --- | --- |
|  | Xh | Y |
| Xh | XhXh | XhY |
| Xh | XhXh | XhY |

XhXh Homozygous for Immunity

1. What is the genotypic ratio (A:B:AB:O) of the cross between a homozygous B and heterozygous A blood types? Draw the Punnett square.

|  |  |  |
| --- | --- | --- |
|  | IB | IB |
| IA | IAIB | IAIB |
|  i | IBi | IBi |

50% type AB and 50% heterozygous type B

1. A puppy whose mother was O type was found to have B type blood. Which of the following male dogs could have been the puppy’s father?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SPOT | LASSIE | BUTCH | KILLER | TRAMP |
| O type | AB type | A type | B type | AB type |

1. Draw a punnett square for the cross of two heterozygous spotted puppies and list the phenotypic and genotypic ratios.

|  |  |  |
| --- | --- | --- |
|  | T | t |
| T | TT | Tt |
| t | Tt | tt |

 Phenotypic ratio 3:1 3 spotted and 1 brown

 Genotypic Ratio 1:2:1 1 homozygous spotted 2 heterozygous spotted 1 homozygous brown

|  |
| --- |
| **Genetic Diseases** |
| 1. PKU
 | An individual cannot break down a particular amino acid |
| 1. Muscular dystrophy
 | Break down in muscle mass |
| 10. huntington’s  | Caused by a dominant allele |
| 11.color blind/cystic fibrosis/ hemophilia/ muscular dystrophy | List 4 sex-linked diseases |
| 12 Sickle cell anemia | Misshaped red blood cells; also resistant to malaria |
| 13.Turner’s syndrome | Only X sex chromosome |
| 14.Down’s syndrome | Trisomy 21 |
| 15.Kleinfelter’s syndrome | XXY sex chromosomes |
| **Pedigrees** |
| 16.SQUARE | Shape for males |
| 17.Circle | Shape for females |
| 18. Have the trait/ disease | Shaded |
| 19. not affected | Unshaded |
| 20. Carrier | Half-shaded |
| **Vocabulary** |
| 21. Polygenic | Type of inheritance found on multiple chromosomes (ex. Skin and hair color) |
| 22.skin/ hair color | Example of a trait with multiple alleles |
| 23. Dominant | Trait that is always seen and covers up the recessive allele |
| 24. Recessive | Trait that can be hidden by a dominant allele |
| 25. complete dominance | When only one trait (dominant) is seen in the heterozygote |
| 26. Co-dominance | When both traits are seen in the heterozygote (black and white spotted) |
| 27. Incomplete | When an intermediate of traits is seen (black and white make gray) |
| 28. Male | An individual with XY |
| 29. Female | An individual with XX |
| 30. Karyotype | Picture of the chromosomes: kleinfelter_karyotype |
| 31. nondisjunction | Failure of chromosomes to separate during meiosis |

32. Label the genotypes in the following pedigree for muscular dystrophy (sex-linked):