Name_____**Date**_____**Period**_____ Bio K/H

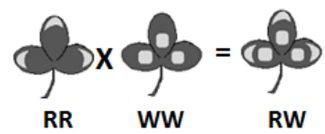
Day 3: Non-Mendelian Genetics: Codominant Traits with Blood Typing

Codominance

A. A cross between organisms with _____ _____ phenotypes
   1. Ex: Red x White

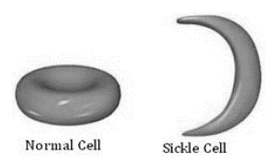
B. Produce offspring with a _____ phenotype that displays _____ traits at the same time
   1. Ex: Red and White striped

C. EXAMPLE: If a **homozygous** _____ flowered snap dragon plant **(RR)** is crossed with a **homozygous** _____ flowered snap dragon plant **(WW)**, **all** of the **F1 offspring** will have _____ _____ _____ flowers.
   1. RED flower x WHITE flower → RED **AND** WHITE flower



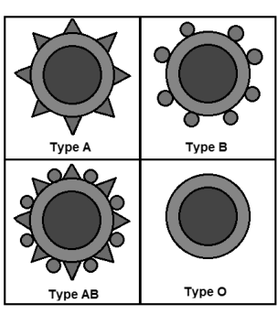
Human Codominance

A. Sickle-Cell Anemia
   1. An individual who is **heterozygous** for sickle-cell alleles will express **BOTH** _____ and _____ blood cells.
      - The oxygen carrying protein hemoglobin differs by one amino acid than the regular cause the shape to change: Normal RBC are _____ and abnormal are _____ or sickle shaped.



   2. Abnormally shaped blood cells _____ _____ _____, _____ _____, and result in tissue damage and _____.
   3. Heterozygous individuals are said to have the sickle-cell trait because they show signs of sickle-cell related disorders if the availability of oxygen is reduced.

B. Blood types
   1. Blood type is determined by _____ alleles. This means there are more than two types of alleles possible that can make up a paring.



_____: red blood cells produce A antigens (carb) on the outside of the cell

A. Allele is expressed I^A because it is _____

_____: red blood cells produce B antigens (carb) on the outside of the cell

B. Allele is expressed I^B because it is _____

_____: red blood cells will _____ produce an antigen (carb)

C. Allele is expressed i because it is _____

   2. Determining Blood types is necessary before you receive a blood transfusion because incompatible red blood cells _____ together or clot causing death.
   3. Your immune system or antibodies recognizes the red blood cells belonging to you. If cells with a _____ _____ of antigen enter your body your immune system will attack them.

Complete the following chart:

Phenotype or blood type	**All Genotypes possible:**	
Type A		
Type B		
Type AB (Codominant)		
Type O (recessive)		

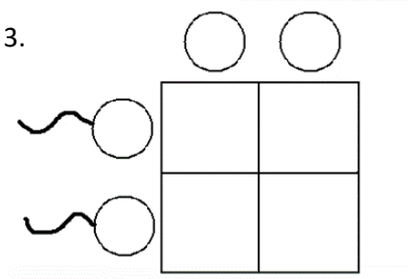
*****The true universal blood donor is O-** *****The true universal recipient is AB+**

<u>SAMPLE PROBLEMS:</u>

Approach #1: Cross a heterozygous type A blood father with a heterozygous type B blood mother.

2. Parents: _____X_____

3.



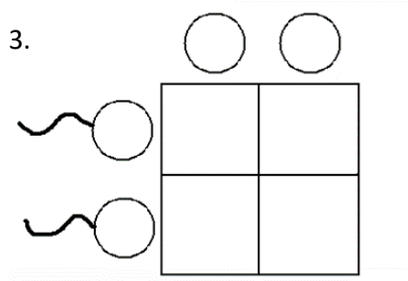
4. Genotype:

5. Phenotype:

Approach #2: Cross a heterozygous type A blood father with a heterozygous type B blood mother.

2. Parents: _____X_____

3.

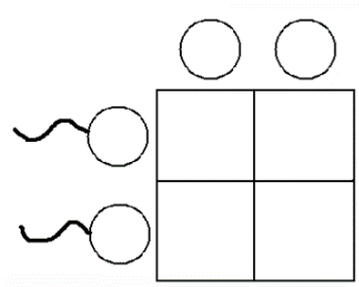


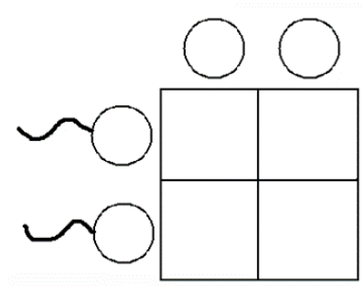
4. Genotype:

5. Phenotype:

<u>Practice Problems: Include all steps.</u>

1. Is it possible for parents with type A blood to have a child with type O blood? _____
   Show your work and PROVE your answer.
   A. If it is possible, list the necessary genotypes of the parents and explain why their child could have a different blood type.



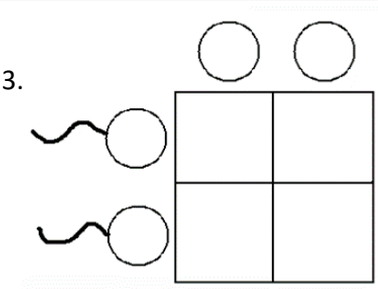


B. What is the genotype of a child with type O blood? _____

C. Work the following cross: **<u>Type AB blood with a parent that is heterozygous type A blood</u>**

2. Parents: _____X_____

3.

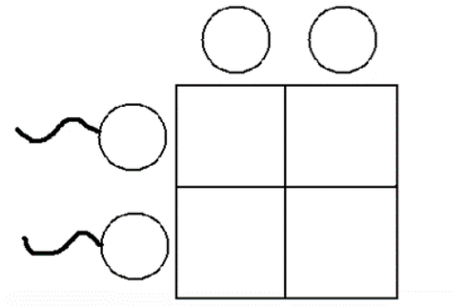


4. Genotype:

5. Phenotype:

2. A man with homozygous A blood has children with a woman with heterozygous B blood. What are the possible blood types for their children?

2. Parents: _____X_____ 3.

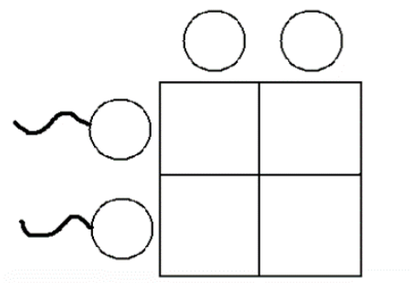


4. Genotype:

5. Phenotype:

3. Pick one child from problem #2 and cross that person with a person with heterozygous A blood.

2. Parents: _____X_____ 3.



4. Genotype:

5. Phenotype:

4. Suppose that a man with type A blood marries a young woman who has type AB blood. What blood types would you expect to find among their children. **Remember to take all possibilities into account.**

5. Mr. Jones was taken to court and charged with being the father of a woman's child. He is homozygous type A blood. She is heterozygous type B blood. The child is type O blood. Is Mr. Jones the father? Show **all** your work.

6. Two newborn babies were accidentally switched in a hospital. In an effort to correct the mistake blood types of the babies and parents were determined. Here are the results of the blood types. Which baby belongs to which parent?

Baby 1 – type O	Mrs. Brown – type B	Mrs. Smith – type B
Baby 2 – type B	Mr. Brown – type AB	Mr. Smith – type B

A. Baby 1 belongs to the parents _____. Prove your answer with 4 steps.

B. Baby 2 belongs to the parents _____. Prove your answer with 4 steps.