

Name: \_\_\_\_\_

Block: \_\_\_\_\_

*5.3.1: Develop or modify a model to predict and justify a change in a system.*

*5.3.3: Evaluate limitations, precision, or reliability of a model in relation to a real world phenomena.*

## WHO DONE IT?

Last night a burglary was committed at Arbor Prep High School. The perpetrator entered the school building through the emergency exit on the roof and stole Franklin, the baby chameleon, from Ms. Lynch's room (Room 201). Ms. Lynch always locks the door to her room. The perpetrator broke the glass window on Ms. Lynch's classroom door to reach the handle and let him/herself in. In doing so, the perpetrator cut his/her arm on shards of broken glass leaving drops of blood behind. Last night, police were tipped off by a parent who witnessed their child, an Arbor Prep student, asking people on the street if they were interested in buying a baby chameleon. Police were able to get a warrant for a sample of each parent's blood to determine if their child could be a possible suspect.

### **Pre-Lab:**

How can blood from a crime scene help solve a crime?

How can we use this to determine who is the perpetrator?

What are the possible blood types?

What are the possible genotypes for each blood type?

### **Lab 1:**

Given samples of both parents' blood, determine the mother's and father's blood type and identify the possible genotypes. If the blood clumps

1. There are four stations. Station 1 is a sample of the Mother's Blood. Place 5 drops of this sample in two wells on your well plate.
2. Test Sample 1 with Type A. Place 2 drops in the well and mix with a toothpick. Record your observations in Table 1.
3. Repeat Step 2 but with Type B in the second well of Mother's Blood. Record your observations in Table 1.
4. Determine the blood type and possible genotypes of the mother.

- Next, test the father's blood sample. Station 2 is a sample of the Father's Blood. Place 5 drops of this sample in two unused wells. Test one with 2 drops of Type A and the other with 2 drops of Type B. Record both observations in Table 2.
- Determine the blood type and possible genotypes of the father.

**Table 1:**

Blood Type Cup	Reaction with Type A	Reaction with Type B
Mother - Sample 1		
Mother - Sample 2		

Mother's Blood Type: \_\_\_\_\_

Possible Genotypes: \_\_\_\_\_

\_\_\_\_\_

**Table 2:**

Blood Type Cup	Reaction with Type A	Reaction with Type B
Father - Sample 1		
Father - Sample 2		

Father's Blood Type: \_\_\_\_\_

Possible Genotypes: \_\_\_\_\_

\_\_\_\_\_

**Lab 2:**

The four possible monohybrid crosses (based on parents possible genotypes):

\_\_\_\_\_ x \_\_\_\_\_

\_\_\_\_\_ x \_\_\_\_\_

\_\_\_\_\_ x \_\_\_\_\_

\_\_\_\_\_ x \_\_\_\_\_

Create a Punnett Square for each possible monohybrid cross & list possible genotypes.

Genotypes of Offspring


Genotypes of Offspring


Genotypes of Offspring


Genotypes of Offspring


**Lab 3:**

While the parents were busy giving samples of their blood, the police also sampled the blood left behind at the crime scene. Determine the blood type and possible genotypes of the crime scene blood.

1. Station 3 is a sample of the Crime Scene Blood. Place 5 drops of this blood in two unused wells. Test Sample 1 with 2 drops of Type A and mix with a toothpick. Record your observations in Table 3.
2. Test Sample 2 with 2 drops of Type B. Record observations in Table 3.
3. Determine the blood type and possible genotypes of the crime scene blood.

**Table 3:**

Blood Type Cup	Reaction with Type A	Reaction with Type B
Crime Scene - Sample 1		
Crime Scene - Sample 2		

Crime Scene Blood Type: \_\_\_\_\_

Possible Genotypes: \_\_\_\_\_  
 \_\_\_\_\_

Is the crime scene blood a match with one of the possible genotypes of the suspected student? Explain your answer.

**Lab 4:**

Police now have a warrant for a blood sample of the suspect due to the student's odd behavior and possible blood genotypes. Using this sample, determine the suspect's blood type and possible genotype.

1. Station 4 is a sample of the Suspect's Blood. Place 5 drops of this sample in two unused wells. Test Sample 1 with 2 drops of Type A and mix with a toothpick. Record observations in Table 4.
2. Test Sample 2 with 2 drops of Type B. Record observations in Table 4.
3. Determine the blood type and possible genotypes.

**Table 4:**

Blood Type Cup	Reaction with Type A	Reaction with Type B
Suspect - Sample 1		
Suspect - Sample 2		

Suspect's Blood type: \_\_\_\_\_

Possible Genotypes: \_\_\_\_\_  
 \_\_\_\_\_

**Results:**

Does the sample of blood from the crime scene match the suspect's blood? Explain your answer.

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**Post Lab:**

If the samples of blood match, what can forensic scientists do next to be sure this is the right person?

What are the limitations or lack of precision in this model?

How did genetics help solve this crime?