ASSIGNMENT # 9

RETURN AN ELECTRONIC COPY (I.E. SCANNED COPY) THROUGH THE LMS PLATFORM
PLEASE CHECK DEADLINES ON THE LAB'S WEBSITE

NAME: _____ **STUDENT #:** _____ **DATE:** _____

IN-PERSON LABORATORY WORK: GEL ELECTROPHORESIS
WORTH 30% OF ASSIGNMENT GRADE (Q#1)

1. Please provide the running conditions for the gel electrophoresis used by your group:

DNA ladder: _____ ul Sample: _____ ul

Voltage: _____ volts Time: _____ min.

Did you (and your group) obtain visible pattern of DNA fragments in the gel electrophoresis?

Yes: _____ No: _____ Potential reason: _____

_____

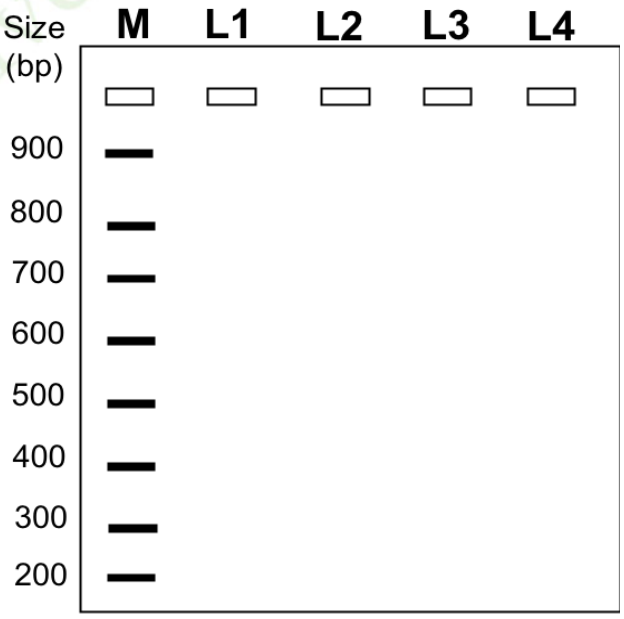
Using the following schematic diagram, sketch the DNA fragments produced by the PCR method of the white locus in *Drosophila*.

L1: P1 white-eyed female

L2: P2 wild type males

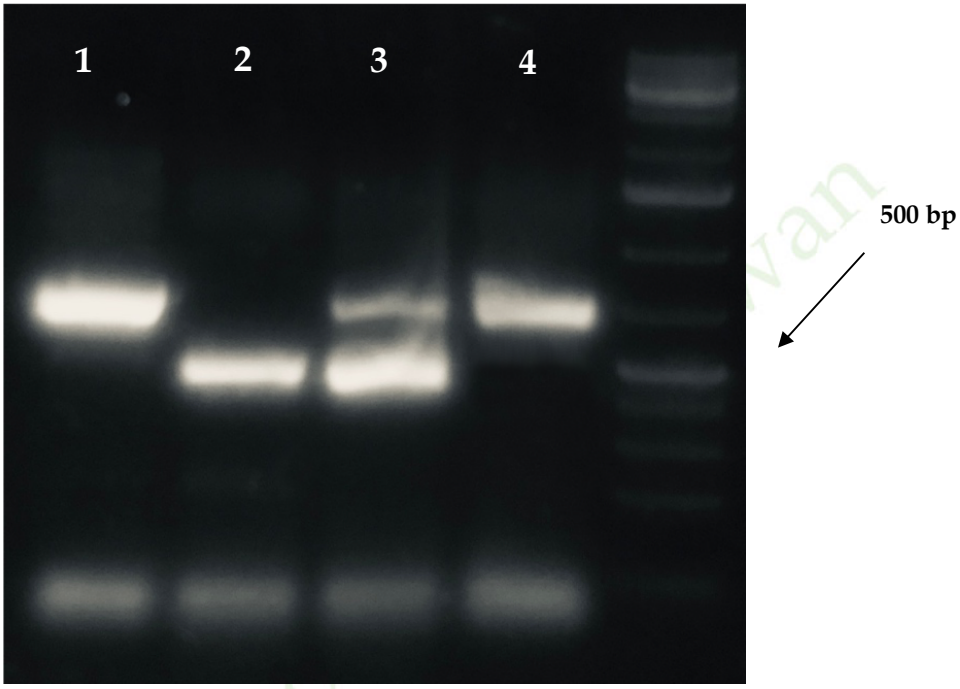
L3: F1 red-eyed female

L4: F1 white-eyed male



CONCEPT UNDERSTANDING

2. Based on the following picture of a gel electrophoresis of the *white* locus in *Drosophila*, please provide the **possible *phenotypes*** of each individual.



Lane 1: _____ **Lane 2**: _____

Lane 3: _____ **Lane 4:** _____

POPULATION GENETICS SIMULATION: GENETICS VIRTUAL LAB

For the next set of questions (3-6), you will use data collected from the "**Generate Population in HW**" app. Access here: www.ampossot.com/hw

3. Click on generate population. Summarize the data in the following tables:

Total individuals: _____

Genotype	Observed number
AA	
Aa	
aa	

p = frequency of allele A: _____ q = frequency of allele a:_____

4. Calculate the expected numbers for each genotype under the assumption of HW

Expected AA: _____ **Expected Aa**: _____ **Expected aa**:_____

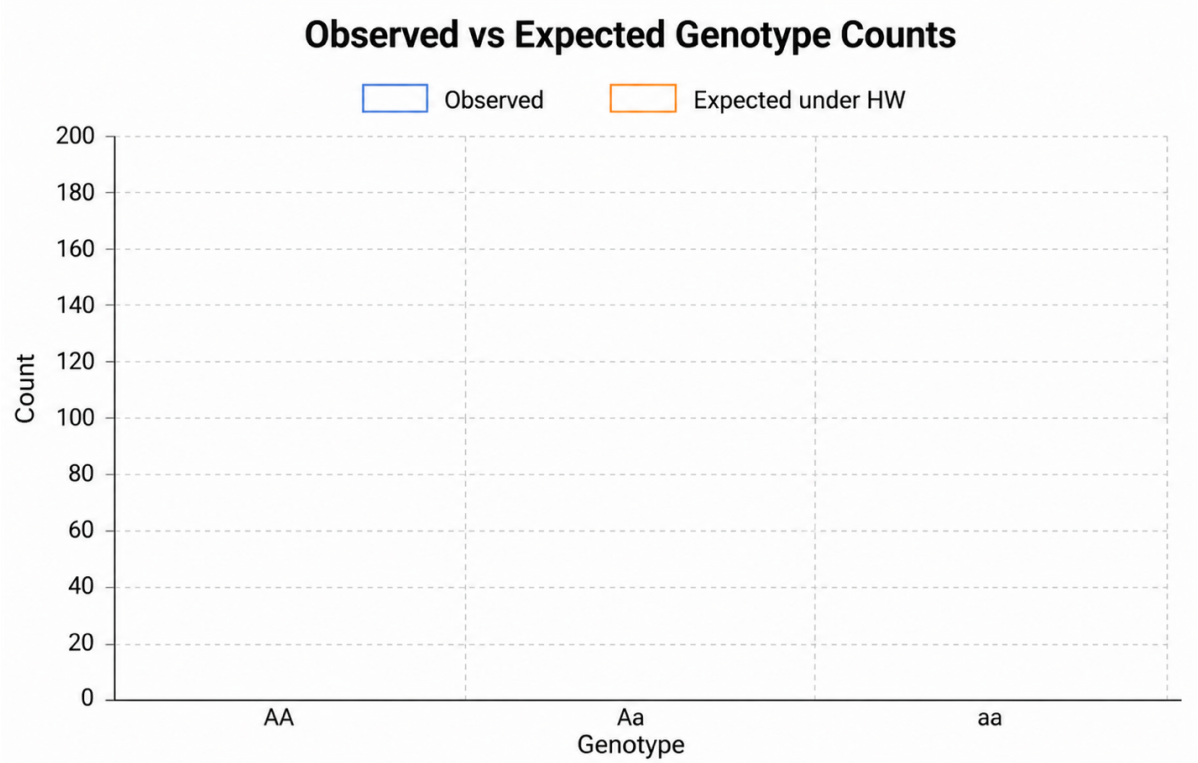
5. X^2 test and analysis: after performing the test, please summarize your results in the following tables:

Genotype	Observed	Expected	$(O - E)^2 / E$
AA			
Aa			
aa			

X^2 value: _____ **Degrees of freedom**: _____ **p-value**:_____

Conclusion:

6. Sketch your results in the following template. Use the app chart as a reference.



For the next set of questions (7-10), you will use data collected from the "**Generate Population NOT in HW**" app. Access here: www.ampossot.com/nonhw

7. Click on generate population. Summarize the data in the following tables:

Total individuals: _____

Genotype	Observed number
AA	
Aa	
aa	

p = frequency of allele A: _____ q = frequency of allele a:_____

8. Calculate the expected numbers for each genotype under the assumption of HW

Expected AA: _____ **Expected Aa**: _____ **Expected aa**:_____

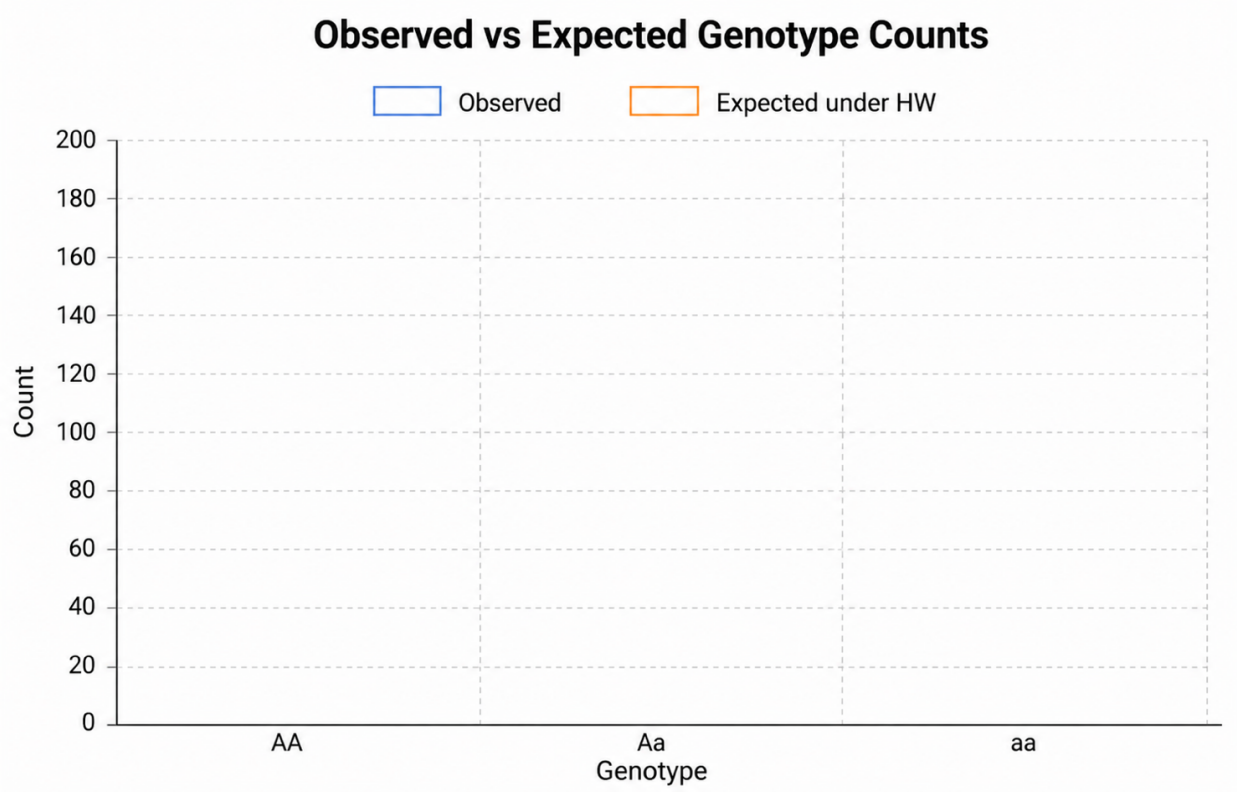
9. X^2 test and analysis: after performing the test, please summarize your results in the following tables:

Genotype	Observed	Expected	$(O - E)^2 / E$
AA			
Aa			
aa			

X^2 value: _____ **Degrees of freedom**: _____ **p-value**:_____

Conclusion:

10. Sketch your results in the following template. Use the app chart as a reference.



For the next set of questions (11-14), you will use data collected from the "**Generate a Random Population**" app. Access here: www.ampossot.com/random

11. Click on generate population. Summarize the data in the following tables:

Total individuals: _____

Genotype	Observed number
AA	
Aa	
aa	

p = frequency of allele A: _____ q = frequency of allele a:_____

12. Calculate the expected numbers for each genotype under the assumption of HW

Expected AA: _____ **Expected Aa**: _____ **Expected aa**:_____

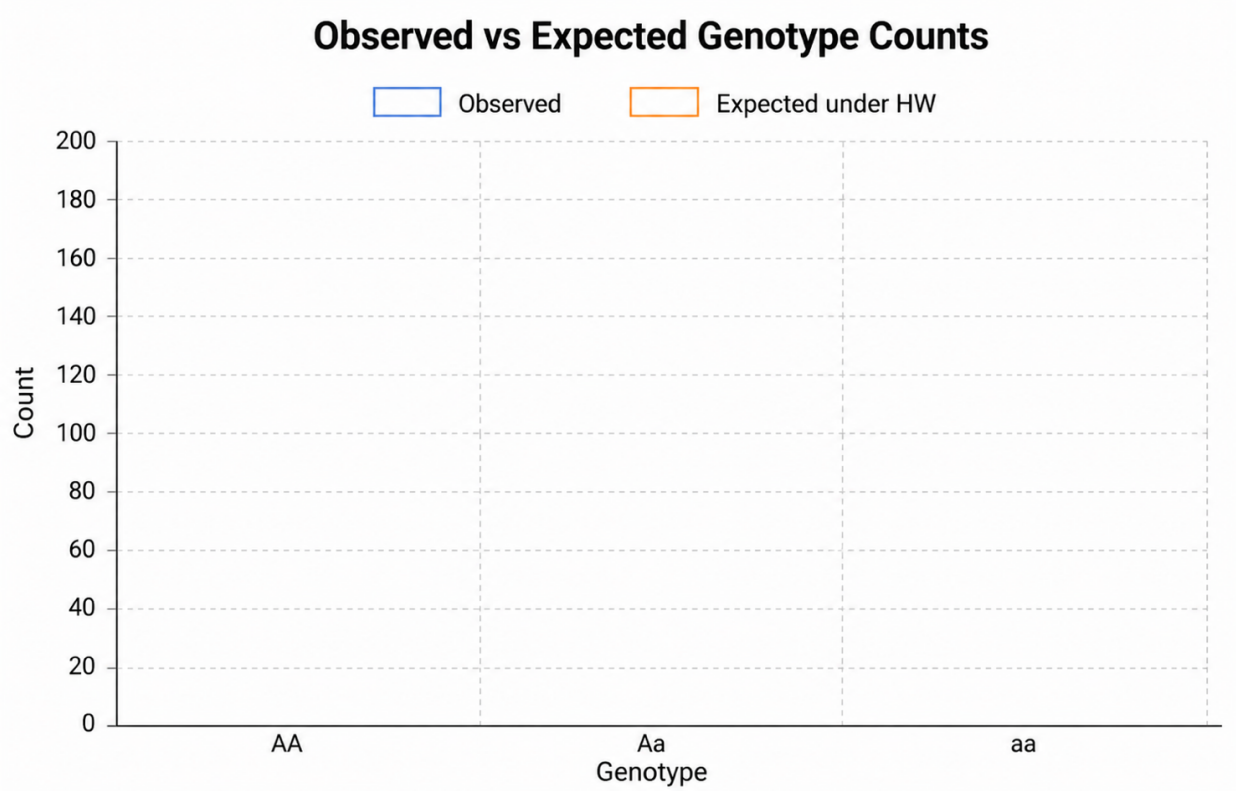
13. X^2 test and analysis: after performing the test, please summarize your results in the following tables:

Genotype	Observed	Expected	$(O - E)^2 / E$
AA			
Aa			
aa			

X^2 value: _____ **Degrees of freedom**: _____ **p-value**:_____

Conclusion:

14. Sketch your results in the following template. Use the app chart as a reference.



TEST YOUR KNOWLEDGE: GENETIC PROBLEM

A population of 1000 *Drosophila* flies was sampled. Researchers observed that 130 flies displayed the **recessive sepia-eye** phenotype. Assume that:

* Sepia eyes are caused by the recessive allele (a)
* Red eyes are dominant (A)
* The population is in Hardy–Weinberg equilibrium
* Hint: Remember that $AA=p^2$, $Aa=2pq$ and $aa=p^2$

15. What is the frequency of the recessive genotype (aa)? Show your work.

16. What is the frequency of the recessive allele (a)? Show your work.

17. What is the frequency of the dominant allele (A)? Show your work.

18. Estimate the Expected frequencies (under HW) of the genotypes and the expected number of flies. Show your work and fill the table below.

Hint: Remember that $AA=p^2$, $Aa=2pq$ and $aa=p^2$

Genotype	Expected Frequency	Expected Number of Flies
AA		
Aa		
aa		

***IMPORTANT NOTE*:**

Return your assignment at the END of the lab session or to submit an electronic copy (i.e., scanned PDF file) through CANVAS