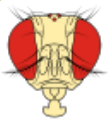
**ASSIGNMENT # 4****DEADLINE: RETURN AT THE END OF THE LABORATORY SESSION****OPTION 1:** Deposit a physical copy in the cart (front of the lab)**OPTION 2:** Submit an electronic copy (i.e., PDF file) through the LMS platform (Canvas)

NAME: _____ STUDENT #: _____ DATE: _____

**IN-PERSON LABORATORY WORK AND IDENTIFICATION OF PHENOTYPES
WORTH 30% OF ASSIGNMENT GRADE (Q#1-2)**

1. After observing the F_2 flies under the dissecting scope, please summarize the obtained data in the table below. y=yellow, w=white, m=miniature, se=sepia, WT= wild-type.

Phenotype	Sex	Amount	Total
WT	F		
	M		
y, w, m	F		
	M		
y	F		
	M		
w, m	F		
	M		
y, w	F		
	M		
m	F		
	M		
w	F		
	M		
y, m	F		
	M		
se	F		
	M		
y, se	F		
	M		
m, se	F		
	M		
y, m, se	F		
	M		



MAPPING BASED ON REAL DATA

During the Winter-2026 term, the biol226 students performed a test-cross between a **wild-type heterozygous** female with a **yellow body, white eyes, and miniature wing male**. The **three** mutations are **recessive**, and **sex (x)-linked**. Fill the table with the observed number of flies.

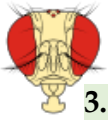
Your lab section (e.g., Tuesday morning): _____

Phenotype (Allele Combination)	Wild (y ⁺ w ⁺ m ⁺)		ywm (y w m)		y (y w ⁺ m ⁺)		wm (y ⁺ w m)		yw (y w m ⁺)		m (y ⁺ w ⁺ m)		w (y ⁺ w m ⁺)		ym (y w ⁺ m)	
Sex	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
Observed Number (O)																

2. For the next set of questions, you will use the **“Three Point Mapping” virtual tool** available on Canvas or here www.ampossot.com/3point. Follow the instructions in the app and use the table below to summarize the observed data. Then, use this information to **map** the three genes (y w m).

Phenotype Class	Observed amount	Genotype (F ₁ female gametes)	*Type of gamete (PR, SR or DR)
Wild type			
Yellow, white, miniature			
Yellow			
White, miniature			
Yellow, white			
Miniature			
White			
Yellow, miniature			
Total			

*PR: Parental; SR: single recombinant; DR: Double recombinant



3. Gene order: _____

Hint: First, identify parental (**PR**) (larger classes) and double recombinant (**DR**) offspring (smaller classes). The gene whose allele differs between the PR and DR classes is the middle gene.

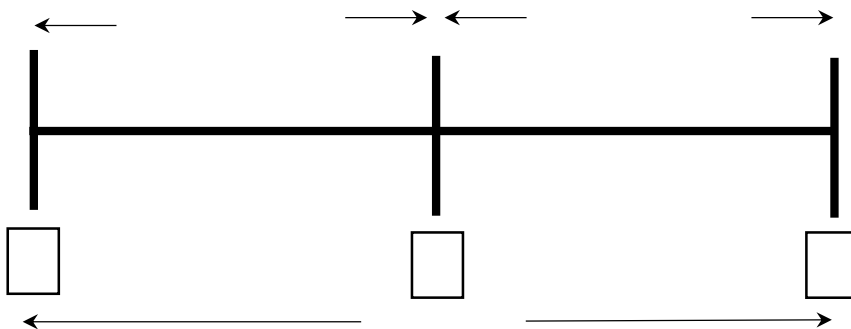
Calculate the genetic distances (show your work and units):

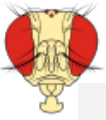
4. y-w=

5. w-m=

6. y-m=

Summary distances (include units):





To calculate Coincidence and Interference, please review the formulas:

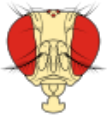
$$C = \frac{\text{Obs. Freq. DR}}{\text{Exp. Freq. DR}}$$

$$I = 1 - C$$

7. C: _____

8. I: _____

9. Please provide a brief explanation of the Coincidence and Interference values that you calculated. Is there any "interference"? What does it mean?



Number of double-recombinant offspring:

DR1: _____ DR2: _____ Gene order: _____

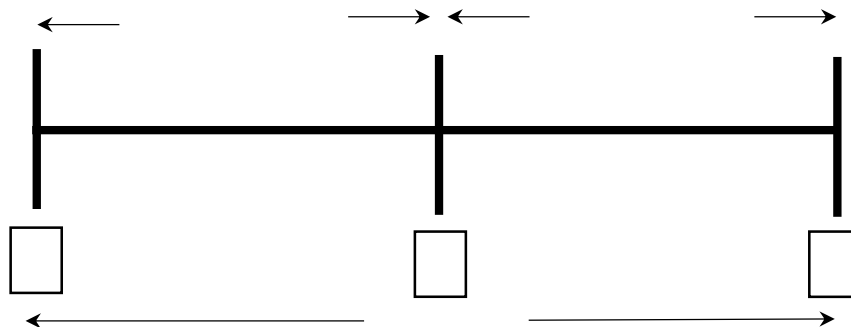
Calculate the genetic distances (**show your work and units**):

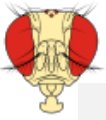
11. gene 1 - 2=

12. gene 2 - 3=

13. gene 1 - 3=

Summary distances:





To calculate Coincidence and Interference, please review the formulas:

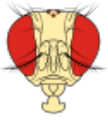
$$C = \frac{\text{Obs. Freq. DR}}{\text{Exp. Freq. DR}}$$

$$I = 1 - C$$

14. C: _____

15. I: _____

16. Please provide a brief explanation of the Coincidence and Interference values that you calculated. Is there any "interference"? What does it mean?

**GENETICS PROBLEM: IMPROVE YOUR SOLVING SKILLS**

Please consider the following information to solve the next genetics problem

In *Drosophila* the genes for body color and wing shape are genetically linked on an autosome (**28 map units**). Black body color and vestigial wing shape are both recessive mutations.

A cross between a female *Drosophila* (**bk⁺ vg⁺ / bk vg**) and a male (**bk vg / bk vg**) produced a progeny of 1000 flies. Out of this progeny, how many flies would be:

Hint: Remember that 22 map units is the same as 22% percentage of recombination

17. Grey body and long wings (**wild-type**)? Show your work.

18. Black body and wild-type wings? Show your work.

***IMPORTANT NOTE*:**

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