Name_____2016

AP Lab 7 Genetics of Organisms- Virtual Fruit Fly LAB
Go to Fly Genetics: http://www.sciencecourseware.org/vcise/drosophila/

Cross 1: Wild Type Female x Vestigial Winged Male

PHENOTYPE	F_1 Generation	F_2 Generation
Wild Type Males		
Vestigial Winged Males		
Wild Type Females		
Vestigial Winged Females		

These data for VESTIGIAL WINGS suggest this pattern is characteristic of a

_____ _____ gene.
dominant recessive autosomal X-linked

Write a NULL hypothesis that describes the mode of inheritance for the VESTIGIAL WING trait.

There is no difference between the observed data and the data expected if vestigial wings is a(n)
_____ _____ ***genetic trait.***

I would expect this pattern in the F_1 offspring _____

I would expect this pattern in the F_2 offspring _____

Are the deviations for the phenotypic ratio of the F_2 generation within the limits expected by chance?
To answer this question, statistically analyze the data using the Chi-square analysis.
Calculate the Chi-square statistic for the F_2 generation in the chart below.

Observed Phenotypes (o)	Expected (e)	(o-e)	$(o-e)^2$	$\frac{(o-e)^2}{e}$
			X^2 =	

Chi-square (X^2) = _____ How many degrees of freedom are there? _____

Referring to the critical values chart, what is the probability (p) value for these data? _____

Remember: The minimum value for rejecting the null hypothesis in the sciences is 0.05. This means that only 5% of the time would you expect to see similar data if the null hypothesis is correct OR you are 95% sure the data does not fit the expected ratio.

If the calculated X^2 value is greater than or equal to the critical value from the table, then the null hypothesis is REJECTED.

According to the probability (p) value, do you accept or reject your null hypothesis for this cross? Explain.

What are the genotypes of the P_1 flies ? FEMALE _____ MALE _____

What are the genotypes of the F_1 flies? FEMALE _____ MALE _____

How is this trait inherited?

Is the mutation autosomal or sex linked? _____

Is the mutation dominant or recessive? _____

Make 2 Punnett squares showing parents and F_1 and F_2 offspring for this trait.

Cross 2: White Eyed Female x Wild Type Male

	F_1 Generation	F_2 Generation
Wild Type Males		
White eyed Males		
Wild Type Females		
White Eyed Females		

These data for WHITE EYES suggest this pattern is characteristic of a

_____ _____ gene.
dominant recessive autosomal X-linked

Write a NULL hypothesis that describes the mode of inheritance for the WHITE EYED trait.
(See cross #1)

I would expect this pattern in the F_1 offspring _____

I would expect this pattern in the F_2 offspring _____

Are the deviations for the phenotypic ratio of the F_2 generation within the limits expected by chance?
Calculate the Chi-square statistic for the F_2 generation in the chart below.

Observed Phenotypes (o)	Expected (e)	(o-e)	$(o-e)^2$	$\frac{(o-e)^2}{e}$
			X^2 =	

Chi-square (X^2) = _____ How many degrees of freedom are there? _____

Referring to the critical values chart, what is the probability (p) value for these data? _____

According to the probability value, can you accept or reject your null hypothesis for this cross? Explain.

What are the genotypes of the P_1 flies ? FEMALE _____ MALE _____

What are the genotypes of the F_1 flies? FEMALE _____ MALE _____

How is this trait inherited?

Is the mutation autosomal or sex linked? _____

Is the mutation dominant or recessive? _____

Make 2 Punnett squares showing parents and F_1 and F_2 offspring for this trait.

Cross 3: Wild Type Female x Sepia Eyed, Dumpy Winged Male

	F_1 Generation	F_2 Generation
Wild Type Males		
Wild Type Female		
Total Wild Types		
Dumpy Winged Males (normal eyes)		
Dumpy Winged Females (normal eyes)		
Total Dumpy Winged (normal eyes)		
Sepia eyed Males (normal wings)		
Sepia eyed Females (normal wings)		
Total Sepia eyes (normal wings)		
Dumpy Wings, Sepia eyed Males		
Dumpy Wings, Sepia eyed Females		
Total Dumpy Wings, Sepia eyed		

These data for DUMPY WINGS suggest this pattern is characteristic of a

_____ _____

dominant recessive autosomal X-linked

These data for SEPIA EYED suggest this pattern is characteristic of a

_____ _____ gene

dominant recessive autosomal X-linked

These data are suggest this pattern is characteristic of a _____ cross.

monohybrid dihybrid

Write a NULL hypothesis that describes the mode of inheritance for the traits (sepia eyes and dumpy wings) you studied. **(See cross #1)**

I would expect this pattern in the F_1 offspring _____

I would expect this pattern in the F_2 offspring _____

Are the deviations for the phenotypic ratio of the F_2 generation within the limits expected by chance?
Calculate the Chi-square statistic for the F_2 generation in the chart below.

Observed Phenotypes (o)	Expected (e)	(o-e)	$(o-e)^2$	$\frac{(o-e)^2}{e}$
			X^2 =	

Chi-square (X^2) = _____ How many degrees of freedom are there? _____

Referring to the critical values chart, what is the probability (p) value for these data? _____

According to the probability value, can you accept or reject your null hypothesis? Explain.

What are the genotypes of the P_1 flies ? FEMALE _____ MALE _____

What are the genotypes of the F_1 flies? FEMALE _____ MALE _____

How is this DUMY WINGS trait inherited?

Is the mutation autosomal or sex linked? _____

Is the mutation dominant or recessive? _____

How is this SEPIA EYED trait inherited?

Is the mutation autosomal or sex linked? _____

Is the mutation dominant or recessive? _____

Are these genes (DUMPY WINGS and SEPIA EYED) linked? _____

Cross 4: DESIGN YOUR OWN CROSS (Cross with a WT)

PHENOTYPE	F_1 Generation	F_2 Generation
Wild Type Males		
Males		
Wild Type Females		
Females		

Write a NULL hypothesis that describes the mode of inheritance for the trait(s) you studied. **(See cross #1)**

I would expect this pattern in the F_1 offspring _____

I would expect this pattern in the F_2 offspring _____

Are the deviations for the phenotypic ratio of the F_2 generation within the limits expected by chance? Calculate the Chi-square statistic for the F_2 generation in the chart below.

Observed Phenotypes (o)	Expected (e)	(o-e)	$(o-e)^2$	$\frac{(o-e)^2}{e}$
			X^2 =	

Chi-square (X^2) = _____ How many degrees of freedom are there? _____

Referring to the critical values chart, what is the probability (p) value for these data? _____

According to the probability value, can you accept or reject your null hypothesis? Explain.

How is this trait inherited?

Is the mutation dominant or recessive? _____

Is the mutation autosomal or sex linked? _____

EXTRA CREDIT LINKED CROSS:
Make a cross between a WILD TYPE FEMALE and a HOMOZYGOUS SPINELESS BRISTLES and EBONY BODY MALE. WATCH BOZEMAN BIOLOGY VIDEO- LINKED GENES to see how to do this
(Basically you will do a test cross between an F_1 female from this cross and a HOMOZYGOUS male fly with spineless bristles AND ebony body (*Use dad from the first cross*!!!!!!!!!!!!!!!)

PHENOTYPE	RESULTS
Wild Type Males	
Wild Type Female	
Total Wild Types	
Ebony body Males (WT bristles)	
Ebony body Females (WT bristles)	
Total Ebony body (WT bristles)	
Spineless bristle Males (WT body)	
Spineless bristle Females (WT body)	
Total spineless bristle (WT body)	
Ebony body spineless bristle Males	
Ebony body, spineless bristle Females	
Total Ebony body, spineless bristles	

Number of Recombinants? _____

Number of Parental? _____

Crossing over frequency? _____

What is the map distance between these genes (EBONY BODY and SPINELESS BRISTLES? _____