

1. (6 points) Consider the following recessive mutations and their chromosomal location for genes found in Drosophila melanogaster:

X- chromosome:	sc	w	rb	cv	lz	m
	0	1.5	7.5	13.7	27.7	36.1
Chromosome-2:	n			bw	sp	
	0			104.5	107.7	
Chromosome-3:	ju	h	wk			
	19.2	26.5	42.0			
Chromosome-4:	ey					
	0					

- bw = brown eyes
- cv = crossveinless wings
- ey = eyeless (small eyes)
- h = hairy
- ju = javelin bristles
- lz = lozenge (narrow) eye
- m = miniature wings
- n = net wings (extra vein)
- rb = ruby eye
- sp = speck body
- sc = scute bristles
- w = white eye
- wk = weak bristles

Complete the table. All P-generation flies are from true breeding stocks. Use the plus/letter system.

Phenotypes of P-generation cross	Give genotype(s) of the F-1	Give genotypes of test cross parents (F-1 female x homozygous or hemizygous recessive male)	Give proportion of test cross progeny homozygous mutant for all genes used in the cross
lozenge miniature female X wild male			

2. (4 points) Various cells in humans have their x-chromosomes imprinted as maternal or paternal and their x-chromosomes are either active or inactive. We may represent X-chromosomes with the letter X and a superscript for maternal (m) or paternal (p) and a subscript for active (a) or inactive (i). Complete the following table by indicating the x-chromosome or x-chromosomes with in the following cell types..

cell	form of x-chromosome
mature sperm cell in a normal male	
a zygote with two x-chromosomes within a normal female	
extra embryonic membranes of a normal female embryo	
a somatic cell of a normal adult female	
primary oocyte (cell about to undergo meiosis) of a normal female	