

Graph and FRQs for Summer #1

1. Read each question carefully. Write your response in the space provided for each part of each question. Answers must be written out in paragraph form. Outlines, bulleted lists, or diagrams alone are not acceptable and will not be scored. **Print out** and **CONSTRUCT** graph on provided grid and respond to each **BOLDED** task verb in items a. and b. on page 2 of 2.

Students in a class are studying patterns of inheritance using genes involved in determining the body color and wing shape of *Drosophila* flies. Each of the genes has only two alleles, one of which is completely dominant to the other.

Each student in the class performed a parental cross between a fly that is true-breeding for ebony body and vestigial wings and a fly that is true-breeding for gray body and long wings. Each student then crossed several pairs of the F_1 flies and determined the phenotypes of 500 of the resulting F_2 flies with respect to body color and wing shape. The students in the class averaged their data for the frequencies of the four possible phenotypes (Table 1).

Table 1. Averaged phenotypic data of F_2 flies

Fly Phenotype	Number of Flies $\pm 2SE_{\bar{x}}$
Ebony body and long wings	98 ± 10
Ebony body and vestigial wings	28 ± 7
Gray body and long wings	293 ± 25
Gray body and vestigial wings	81 ± 10

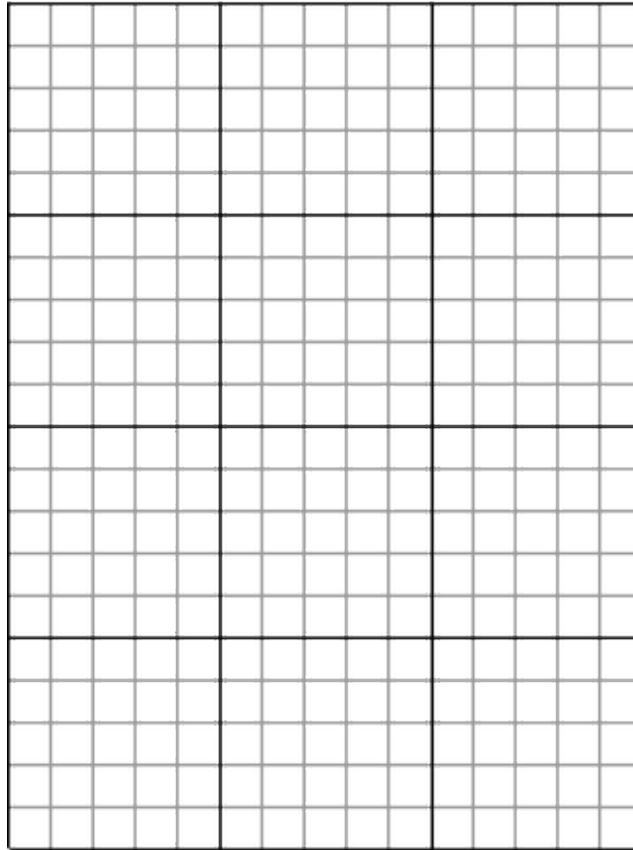
The students performed a second cross. The parental cross was between flies that are true-breeding for gray bodies and long wings and flies that are true-breeding for ebony bodies and curly wings. They crossed pairs of F_1 flies and determined the phenotypes of the resulting F_2 flies. The students found an approximate 3:1 ratio of flies with the dominant phenotype (gray bodies and long wings) to flies with the recessive phenotype (ebony bodies and curly wings). Only a few of the flies expressed the dominant phenotype of one trait and the recessive phenotype of the other trait.

(a) In the first analysis, all of the F_1 flies from the students' crosses have the identical phenotype with respect to body color and wing shape, but the F_2 flies have four different phenotypes. **Describe** how fertilization contributes to this genetic variability.

(b) Using the template, **construct** an appropriately labeled graph, including error bars, to represent the data in Table 1. Based on the data in Table 1, **determine** whether there is a significant difference between the number of flies in each of the four phenotypes.

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TEMPLATE FOR PART (b)



RESPOND HERE!

1. (a)

(b)