

### Recombination/Linkage problem:

In fruit flies, red eyes (wild) is dominant to sepia (sp), and winged (wild) is dominant to apterous (ap). A heterozygous wild fruit fly is mated with a sepia-eyed, apterous fruit fly. The total offspring are:

wild/wild – 250

wild/apterous – 125

sepia/wild – 125

sepia/apterous – 250

1. Based on the ORIGINAL parents given – what SHOULD your predicted ratio be? (This is NOT Mendel's magic numbers!)
2. Are these genes linked or unlinked? Explain your answer.
3. If they are linked, how many map units apart are the genes?

### Recombination/Mapping Problem

Use the following recombination frequencies/percentages to determine the order of these genes on the chromosome.

Draw out your final map.

Genes: a, b, c, d

**a, d = 8%**

**a, b = 10%**

**b, d = 18%**

**b, c = 16%**

**a, c = 6%**

### Recombination/Frequency Problem Part I

Two genes are known to be linked. The map distance between the genes is 12 map units. Out of 1000 total offspring produced by 2 heterozygous parents, predict how many would occur in each phenotypic category.

### Recombination/Frequency Part II

The actual numbers of the offspring are:

Homozygous dominant for both traits: 562

Recessive / Dominant: 187

Dominant / Recessive: 189

Homozygous recessive for both traits: 62

Does this data support that these genes are linked? Explain. Be sure to use numbers in your explanation.

Branch Diagram Example:

The parents are:  $AAbbCcdd \times AaBBccDD$

Predict the outcome (probability) that:

1. Offspring will have at least 2 heterozygous traits
2. Offspring will have at least one recessive trait
3. Offspring will have all heterozygous traits
4. Offspring will have at least one homozygous dominant trait