Module 4C Questions:

1. Researchers are studying color preferences in a group of laboratory mice. Mice are offered **three colors** of chew toys: **red, blue, and green**. Out of 60 total toy selections:

- Red: 28
- Blue: 20
- Green: 12

A scientist claims that mice **prefer these colors in a 3 : 2 : 1 ratio** (not equal proportions).

*Explain how the chi-squared goodness-of-fit test could be used to evaluate whether the observed toy selections match the scientist's proposed **3 : 2 : 1 distribution**, and why the chi-squared test does not require the expected proportions to be equal.*

2. **Do observed genotype counts for a SNP in an F2 cross fit the expected Mendelian 1:2:1 ratio?** Conduct a $\chi 2$ goodness of fit test.

Suppose we observe the following genotypes in 35 F2 mice:

Genotype	**Observed count**	**Expected count (1:2:1)**
AA	9	
Aa	18	
aa	8	