More Chi Square Practice Problems
AP Biology

1. In peas, yellow seeds are dominant over green seeds. In a cross between two plants both heterozygous for seed color, the following was observed:

yellow = 4400
green = 1624

What do you predict the expected phenotypic ratio to be?

State a NULL hypothesis for this experiment:

Phenotype	**Observed (o)**	**Expected (e)**	**(o-e)**	**$(o-e)^2$**	**$\frac{(o-e)^2}{e}$**
				$\chi^2 = \frac{(o-e)^2}{e}$	

Degrees of freedom (df) =

Does the analysis support or reject the null hypothesis?

What does this mean in "real life" language?

2. In peas, smooth seeds are dominant over wrinkled seeds. In the P generation, a plant homozygous for smooth seeds is crossed with a plant with wrinkled seeds. The resulting F_1 plants are crossed. The seeds of the observed F_2 generation were:

smooth = 5474
wrinkled = 1850

What do you predict the expected phenotypic ratio to be?

State a NULL hypothesis for this experiment:

Phenotype	**Observed (o)**	**Expected (e)**	**(o-e)**	**$(o-e)^2$**	**$\frac{(o-e)^2}{e}$**
				$\chi^2 = \frac{(o-e)^2}{e}$	

Degrees of freedom (df) =

Does the analysis support or reject the null hypothesis?

What does this mean in "real life" language?

3. In a flowering plant, white flowers are dominant over red, and short plants are dominant over tall plants. When two plants heterozygous for both traits were crossed, the resulting phenotypes were observed:

white, short = 206
red, short = 83
white, tall = 65
red, tall = 30

What do you predict the expected phenotypic ratio to be?

State a NULL hypothesis for this experiment:

Phenotype	**Observed (o)**	**Expected (e)**	**(o-e)**	**$(o-e)^2$**	**$\frac{(o-e)^2}{e}$**
				$\chi^2 = \frac{(o-e)^2}{e}$	

Degrees of freedom (df) =

Does the analysis support or reject the null hypothesis?

What does this mean in "real life" language?

4. In corn, purple kernels are dominant over yellow, and smooth kernels are dominant over shrunken. The offspring below are the result of a true dihybrid cross. The F_1 ear of corn has 381 kernels with the following types:

purple/smooth = 216
purple/shrunken = 79
yellow/smooth = 65
yellow/shrunken = 21

What do you predict the expected phenotypic ratio to be?

State a NULL hypothesis for this experiment:

Phenotype	**Observed (o)**	**Expected (e)**	**(o-e)**	**$(o-e)^2$**	**$\frac{(o-e)^2}{e}$**
				$\chi^2 = \frac{(o-e)^2}{e}$	

Degrees of freedom (df) =

Does the analysis support or reject the null hypothesis?

What does this mean in "real life" language?

5. Color blindness is a sex-linked trait in Wombats. A female who is a carrier of the color blind allele mates with a male who is color blind. The phenotypes of their offspring are:

Normal female	=	132
Color blind female	=	124
Normal male	=	126
Color blind male	=	136

What do you predict the expected phenotypic ratio to be? State a

NULL hypothesis for this experiment:

Does the analysis support or reject the null hypothesis?

What does this mean in "real life" language?

6. In cats, fur color is determined by the codominant, sex-linked alleles: black and orange. A calico female has several litters of kittens with a black male. They produce the following offspring:

black female	=	78
calico female		65
black male	=	81
orange male	=	45

What do you predict the expected phenotypic ratio to be?

State a NULL hypothesis for this experiment:

Does the analysis support or reject the null hypothesis?

What does this mean in "real life" language?