χ^2 Analysis: Expected vs Observed Values

Name: _____Date: _____ Period: _____

χ^2 tests the null hypothesis. The formula is:

$$\chi_2 = \Sigma \frac{(o-e)^2}{e}$$

Where o is the number of observed and e is the number of expected.

Observed Phenotypes (o)	Expected(e)	(o−e)	$(o-e)^2$	$\frac{(o-e)^2}{e}$
			$\chi^2 = \Sigma\frac{(o-e)^2}{e} =$	

Calculate χ^2

To determine how the observed and expected values compare, we need to use the critical values of χ^2 table that follows.

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PROBABILITY (p)	DEGREES OF FREEDOM (df)				
	1	2	3	4	5
0.05	3.84	5.99	7.82	9.49	11.1
0.01	6.64	9.21	11.3	13.2	15.1
0.001	10.8	13.8	16.3	18.5	20.5

To use the table, you need to determine the "degrees of freedom". "Degrees of freedom" equals the number of categories minus 1.

To determine the critical values of χ^2, it is standard practice to use the 0.05 p value. This signifies that if the value of our calculated χ^2 is greater than or equal to the critical value from the table, 95% of the time chance alone could not account for the difference.

USING χ^2 : WE COMPARE THE CRITICAL VALUE (FROM THE TABLE) WITH THE CALCULATED VALUE (OUR CALCULATIONS).

If the calculated value of χ^2 is greater than or equal to the critical value of χ^2, we reject the null hypothesis and accept the alternate hypothesis concluding that there is a difference between observed and expected values.

If the calculated value of χ^2 is less than the critical value of χ^2, we accept the null hypothesis that says there is no difference between the observed and expected values.