CHI-SQUARE GOODNESS OF FIT TEST

This test is used to determine if observed counts are equal to a hypothesized distribution.

A researcher believes the Mars Company is misleading the public on its color distribution of M&Ms. He wants to compare the color distribution from a random sample of M&Ms to the Mars Company's expected values:

	Brown	**Red**	**Yellow**	**Green**	**Orange**	**Blue**	**Purple**
Sample	4	4	16	10	8	4	4
Expected	.10 (5)	.20 (10)	.20 (10)	.10 (5)	.10 (5)	.10 (5)	.20 (10)

H STATE NULL AND ALTERNATIVE HYPOTHESES:

H_o: Color distribution of M&Ms is the same as the company claims

H_a: Color distribution of M&Ms is different than the company claims

A DETERMINE THAT CONDITIONS FOR TEST ARE ACCEPTABLE:

- SRS- unknown although the sample was random
- Counts (not percents)- yes
- Every expected count ≥ 1 and 80% ≥ 5- yes

T PERFORM TEST:

a) Calculate Chi-Square statistic:

$X^2 = \Sigma (O_i - E_i)^2 / E_i = (4-5)^2/5 + \ldots + (4-10)^2/10 = 18.0$

b) Determine Degrees of Freedom = Number of Categories – 1 = 7 – 1 = 6

c) Determine P-Value

i) Using Table E:

P-value < .01 for X^2 of 18 and degrees of freedom 6

ii) Using calculator:

DISTR → 7: X^2 cdf (18, 100, 6) → p = .006

S STATE CONCLUSION IN CONTEXT

There is very good evidence to reject H_o (p = .006) and conclude that the color distribution of M&Ms is **not** what the company claims it should be.