Part III of Project

M&M Colors

The M&M/Mars Corporation makes a variety of M&M candies. In 1995, they decided to replace the tan colored M&Ms with a new color. After conducting an extensive national preference survey, they decided to replace the tan M&Ms with blue M&Ms. The company's Consumer Affairs Department announced:

> *On average, the new mix of colors of M&M's Plain Chocolate Candies will contain 13% browns, 20% oranges, 14% yellows, 13% reds, 16% greens and 24% blues.*
> *While we mix the colors as thoroughly as possible, the above ratios may vary somewhat, especially in the smaller bags. This is because we combine the various colors in large quantities for the last production stage (printing). The bags are then filled on high-speed packaging machines by weight, not by count.*

The purpose of this activity is to compare the color distribution in a sample of M&Ms with the advertised distribution.

1. What is the model for the M & M distribution? (4 pts)

2. What is the null and alternative hypotheses? (In context) (6 pts)

Data collection & summary

3. Open your bag and count your M&Ms & record your color totals in the chart below, then calculate the third row. (6 pts)

Color	Brown	Yellow	Red	Orange	Green	Blue
My Counts						
Expected (E)						
$\frac{(O-E)^2}{E}$						

4. In a group of 3 or 4 collect the individual counts from each student, then take the sum for each color and put that total in the observed row of the chart below. Finally fill in the rest of the chart below. (6 pts)

Group Counts of M&Ms

Color	Brown	Yellow	Red	Orange	Green	Blue
Observed (O)						
Expected (E)						
$\frac{(O-E)^2}{E}$						

5. What was the group's total sample size? n = _____ (2 pt)

Analysis & conclusions

6. Test your hypotheses using your individual data at a 5% significance level. Be sure you include ALL aspects of an appropriate hypothesis test, even if stated prior. (60 pts)

7. Now test your hypotheses for the group counts at the 5% significance level. You only need to include the Chi-Square value and p-value of your test, if you have the same conclusion as the individual counts just write "same conclusion" if different, then write the new conclusion. (8 pts)

8. Discuss your results:

- Which p-value do you think is more reliable to base your conclusion on? (The group or the individual one and why?) (6 pts)

- Why can we assume that the random sample check is met even though it doesn't state it in the opening paragraphs? (2 pts)