Group Name:

Group Members:

You have just completed your original experiment on M&Ms, when a scientist in your group comes in with historical documents from the Manufacturing Department, indicating that M&Ms used to be made with natural coloring, and switched to synthetic coloring in the late 1960s.

**Changing Hypothesis**

Based upon the results of your previous experiment, and the new information that just became available, state a new hypothesis, and a new Null Hypothesis for this experiment.

Hypothesis:

BROWN natural-Colored Candy coated chocolates will taste different from other colors.

Null Hypothesis:

BROWN natural-Colored Candy coated chocolates will not taste different from other colors.

**Experimental Design**

Unfortunately, Hershey’s no longer makes M&Ms with natural coloring. However, you were able to procure some natural coloring candy-coated chocolates from a small manufacturer. Unlike your almost unlimited supply of M&Ms (you do work for Hershey’s), the supply of this candy is limited. Each group will only have access to 10-20 pieces of candy of multiple different colors.

Let’s first take stock of the candy you have available:-

How many are brown?

Should be less than 5.

Are there enough Brown candy for you to test your hypothesis such that you are confident of the results?

No, if you have 5 brown candy, you can only do 1 experiment with 10 repetitions. No repeats and low number makes it a difficult experiment to conclude anything about.

*You realized that it would be impossible to conduct the experiment the way you had previously designed.*

This oftentimes happens with experiments; where the resources needed to conduct the perfect experiment is just not available. Given the resources you have, discuss in your group an alternative experimental approach you can conduct with the resources available, and the hypothesis you will be testing with this experiment.

Alternative Approach:

Instead of guessing if a candy is brown, you can ask the subject to guess if the candy is the same or different color than the one before it. You can then use all the candy available, not limited by number of brown candy.

Hypothesis:

Different natural-Colored candy-coated chocolates will taste different depending on color.

Null Hypothesis

All candy-coated chocolates taste the same regardless of color.

Write your protocol below. Record your experimental results as well.

Result:

Conclusion:

For discussion on ADHD and artificial dyes, the perfect experiment would be able to show that artificial dyes are both sufficient, and necessary to cause ADHD.

Sufficient. In a population with no previous exposure to AC, feeding them AC (with no other change) will cause an increase in ADHD.

Necessary: In children with ADHD, removal of AC is enough to stop ADHD behavior in children in both short and long term.

Combination: If you then add back AC in the diet of children where ADHD has stopped, ADHD returns.