
m&m Experimental Design



This activity can be used to introduce the concept of Experimental Design. Many students enter AP Statistics with a basic understanding of the fundamentals behind designing a controlled experiment. This group activity serves as a means for the teacher to assess student understanding prior to the unit on producing data.

Materials Needed:

- One 1.69oz bag of m&m's per group (optional)
- Presentation paper for each group (butcher paper, bulletin board paper, etc.)

Activity:

Discuss the importance of producing “good” data for “good” statistics. In order to have faith in our statistical calculations and inferences, we must have faith in our data. This unit will focus on the methods behind collecting data through sampling and experimental design.

Break the class into groups of four students each. Each group will be given the task of designing an experiment to test the effectiveness of m&m's as a stress reliever. Each group will have 20 minutes to design an experiment to determine whether or not eating m&m's reduces stress. Since this activity is done at the beginning of the unit on experimental design, little instruction will be given. Students are given a chance to develop and share their designs, giving you a chance to determine what students already know as well as a chance to point out errors in their logic and discuss improvements that could be made.

Some students may be able to construct an experiment that incorporates the concepts of control, randomization, and replication. Some may be able to incorporate blocking or other designs without knowing the technical terminology. Other groups will design a basic experiment with flaws in the control or randomization aspects. This can serve as a great discussion starter and provide a basis for defining the key components of a well-defined experiment.



m&m's as Stress Relief? Intro to Experimental Design

Your research firm has been asked to look into your teacher's claim that eating m&m's reduces stress. Being good statisticians, you know that in order to test this claim, you'll need to collect some data. Your group's task is to design a **completely controlled randomized experiment** to collect data to test the effectiveness of eating m&m's for stress reduction.

Your group has the following resources at its disposal:

- 200 volunteers (100 male and 100 female of varying ages and backgrounds)
- 1 month to conduct the experiment
- Enough m&m's to give all volunteers one bag per day
- Enough generic m&m's (ChocoBites) to give all volunteers one bag per day
- A valid clinical stress assessment multiple choice test (stress measuring tool)
- Other reasonable resources your group deems necessary

Using these resources, or others you feel are necessary, design an experiment to test the claim. Your design should be detailed enough that someone with no statistical knowledge could replicate the experiment. Further, your experiment should take the following into consideration:

- Males and females deal with stress differently.
- Some people feel chocolate, in general, helps reduce stress
- Stress differs from person to person: work, family, school, relationships, etc.

Use a sheet of bulletin board paper to present your design. Your presentation should include an experimental question (What are you trying to answer?), a diagram, a written description of your experiment (Who is involved? How will you carry this out?), and a discussion of possible confounding variables.

Use the space below to draft your design...consider the following questions:

What is your experimental question? What are you trying to answer?

What are some possible causes of stress? What are some possible stress-reducers *other than* m&m's?

What will you measure to determine if stress is being reduced? How will you be able to tell if it is being reduced?

What are some possible problems with your experiment?