**Results**

The team was given the task to assess which combination of 4 factors would result in the highest attendance rate. A survey will be sent out to the some of the 1.5 million people living in the Raleigh-Durham area. The four factors include: location of the park, type of experience, price, and attractions (denoted as other). There are five possible locations: Apex, Chapel Hill, downtown Raleigh, North Raleigh, and southern outskirts of Durham. It is assumed that 1% of the population will visit the park (attendance rate) but other factors can increase this up to 4% per factor.

After thorough investigation, the team ultimately ended up choosing a complete randomized block Design (RCBD). It was assumed that each area had their own unique subpopulation, whose distinct characteristics may make it more difficult to determine the actual effects of the factors of the experiment. By using a block design, the team could account for the variability between individuals living in different locations. A Balanced Incomplete Block design was briefly considered to reduce the required number of surveyed people, however there was no viable design given the number of treatments and replicates. Within the experiment the team will survey the target population, to understand which combination of the 4 different factors being tested will result in the highest attendance rate.

Before the team could block, a power calculation was performed to find out how many individuals would be need to in each block. The power calculation was calibrated so that the team would be able to detect a minimum difference of 2.5%? between a certain combination of factors and the baseline attendance rate of 1%. The sample size is based making comparisons between the effects of: some of the price points compared to one another, certain types of experiences being compared to one another, and comparisons of specific locations to one another. Some interactions between factors have been theorized and will also be considered during analysis. One interaction deal with all the various price points and the potential attractions at the park. It was concluded that a lower price coupled with one or multiple attractions could have a non-linear positive effect on the park’s attendance rate, as customers would see a lot of value being provided for a low price. On the other hand, a high price and no attractions may have an opposite effect. The other interaction deals with price and type of experience. It’s possible that individuals may be willing to pay more or less money depending on the type of experience being offered at the park. This was theorized to have a non-linear effect on the attendance rate, similar to price and attractions. The alpha value used in the power calculation was adjusted using the Bonferroni, in order to account for all 17 comparisons being made. The resulting alpha value is .02941. Since the team is wanting to make so many comparisons and Bonferroni correction is a very conservative it may be difficult in finding a test that indicates a difference between the level’s effects.

The team decided to use 5 blocks since there were 5 possible park locations that were reasonably spread throughout the Raleigh/Durham area. To allocate people to one of the 5 blocks the Euclidean distance between a person’s longitude and latitude and the longitude and latitude of the park. Utilizing this method, the team believed that it more than adequately blocked for the differences between the subpopulations in the entire area. The treatments were then randomly assigned to each individual within each block. Each treatment is composed to a unique set of levels (options) from each factor.