**Problem Statement**

The amusement park has seen a recent drop in guest spending on food vendors. This is a concerning trend, as food sales are a significant source of revenue for the park.

**Experiment Objective**

The objective of this experiment is to identify the best solutions to improve the performance of food sales. The experiment will focus on the following factors:

* Variety of food options
* Prices of food
* Quality of food
* Location of food vendors
* Discounts on food

**Output Response**

The output response for this experiment is the total revenue generated from food sales.

**Input Factors**

The input factors for this experiment are the following:

* Variety of food options: The number of different food items that are offered by the vendors at the park.
* Prices of food: The average price of food items at the park.
* Quality of food: The perceived quality of food items at the park.
* Location of food vendors: The locations of food vendors within the park.
* Discounts on food: The number and type of discounts that are offered on food items at the park.

**Input Factor Levels**

The input factor levels for this experiment are as follows:

* Variety of food options: 3 levels (low, medium, high)
* Prices of food: 3 levels (low, medium, high)
* Quality of food: 3 levels (low, medium, high)
* Location of food vendors: 3 levels (convenient, inconvenient, very inconvenient)
* Discounts on food: 3 levels (few, many, very many)

**Experiment Design**

The experiment will be a full factorial design with 27 trials. This means that each input factor will be set at all three levels, and each combination of input factors will be tested once.

**Sample Size**

The sample size for this experiment will be 100 guests. This sample size will be sufficient to detect significant differences in food sales between the different treatment conditions.

**Data Collection**

The data for this experiment will be collected by observing the number of food items purchased by guests and the total amount of money spent on food.

**Data Analysis**

The data for this experiment will be analyzed using a two-way ANOVA. This statistical test will allow us to determine if there are significant differences in food sales between the different treatment conditions.

**Conclusions**

The results of this experiment will be used to identify the best solutions to improve food sales at the amusement park. The solutions that are identified will be implemented, and the impact of these solutions will be monitored.

**Lean and Six Sigma Concepts**

The concepts of lean and six sigma can be used to sustain the improvement in food sales. Lean is a set of principles that can be used to identify and eliminate waste in a process. Six sigma is a set of statistical tools that can be used to improve the quality of a product or service.

By applying the concepts of lean and six sigma, the amusement park can sustain the improvement in food sales and ensure that the improvements are not temporary.

**Implementation Plan**

The following steps will be taken to implement the solutions that are identified from the experiment:

1. The solutions will be implemented in a pilot test.
2. The impact of the solutions will be monitored.
3. The solutions will be implemented on a larger scale if they are successful.

**Sustainability Plan**

The following steps will be taken to sustain the improvement in food sales:

1. The concepts of lean and six sigma will be used to identify and eliminate waste in the food sales process.
2. The statistical tools of six sigma will be used to improve the quality of food items.
3. The process for collecting and analyzing data will be standardized.
4. The employees who are responsible for food sales will be trained on the new procedures.

**Conclusion**

The proposed experiment will help the amusement park to identify the best solutions to improve food sales. The solutions that are identified will be implemented, and the impact of these solutions will be monitored. The concepts of lean and six sigma will be used to sustain the improvement in food sales.