# Title Information

Ishika Patel

Determine if the Texture of a Surface Affects the Chances of Rolling Doubles on Dice

June 6, 2020

N/A

Table of Contents

[Title Information 1](#_Toc42281908)

[Data and Observations / Calculations 2](#_Toc42281909)

[Question 2](#_Toc42281910)

[Hypothesis with Variables 2](#_Toc42281911)

[Null Hypothesis 2](#_Toc42281912)

[Alternative Hypothesis 2](#_Toc42281913)

[Photo Requirements 3](#_Toc42281914)

[Digital Net Diagram 5](#_Toc42281915)

[Materials 5](#_Toc42281916)

[Procedure 5](#_Toc42281917)

[Conclusions 6](#_Toc42281918)

[Table of Data 6](#_Toc42281919)

[Sources 7](#_Toc42281920)

# 

# 

# Data and Observations / Calculations

## Question

Does the texture of a surface determine how likely it is to roll doubles on a pair of dice? Given smooth granite and rough carpet determine whether the surface the dice are rolled on impacts the number of times a double (both dice are the same value) is rolled.

## Hypothesis with Variables

### Null Hypothesis

The surface you roll a pair of dice on does not determine how likely it is to roll doubles.

### Alternative Hypothesis

If a pair of dice is rolled on smooth granite and rough carpet, then it is more likely that the dice will roll doubles on granite. Therefore, the texture of a surface does determine how likely it is to roll doubles on a pair of dice.

KEY:

Variables

Expected Conclusion

## Photo Requirements

Activity 3, after the completion of step 1

A close up of text on a white background

Description automatically generated

Activity 3, Step 1 Documentation

A close up of a book

Description automatically generated

Activity 3, Step 2 Documentation (Granite)

A close up of text on a white background

Description automatically generated

Activity 3, Step 2 Documentation (Carpet)

## Digital Net Diagram

A close up of a map

Description automatically generated

## Materials

1. Pair of 6-sided dice
2. Smooth granite surface
3. Rough carpet surface
4. Pencil + Paper to Record
5. Camera to Document

## Procedure

1. Gather materials.
2. Roll a pair of fair 6-sided dice on smooth granite.
3. Record if the dice rolled are doubles – meaning both are the same value.
4. Repeat steps 2-3 50 times.
5. Roll a pair of fair 6-sided dice on rough carpet.
6. Record if the dice rolled are doubles – meaning both are the same value.
7. Record steps 5-6 50 times.
8. Calculate likelihood of rolling doubles on each surface.
9. Propose a conclusion.

# Conclusions

## Table of Data

|  |  |  |  |
| --- | --- | --- | --- |
| Data of Dice Rolling Experiment | | | |
| Surface Texture | Number of Dice Rolls Total | Number of Dice Rolls Which Were Doubles | Likelihood of Rolling Doubles |
| Granite | 50 | 13 | 13/50 |
| Carpet | 50 | 8 | 8/50 |

This question originated by my recent hobby of playing board games. Notorious for losing in Monopoly, I wanted to know what the best surface was to play the game for my outcomes to be the most optimum. In my opinion, the luckiest roll is rolling doubles – that way I can escape Monopoly jail. For this reason, I asked: Does the texture of a surface determine how likely it is to roll doubles on a pair of dice?

After conducting my experiment, I learned that the texture of the surface does determine how likely it is to roll doubles on a pair of dice. From the data collected, I learned that granite is the better surface to roll dice on in order optimize the likelihood of rolling double on the dice.

During this process, I learned that the most beneficial part of the scientific method for me was drawing out my net diagram. This diagram was able to keep me focused on delivering data for the experiment. From the scientific method, I learned how it is very important to be conduct my experiment slowly and to evaluate the procedure I am conducting to deliver the fairest results. Something that I made sure to utilize within the scientific process was to repeat my experiment. From taking a statistic course, I knew that 30 data points was a solid size in order to fulfil the Central Limit Theorem from the course. For this reason, I conducted each part of the experiment 50 times.

The experiment went well. I had to adjust my tactic on rolling dice in carpet because the carpet made it so the dice would tilt and not always clearly show a side. In each roll, I made sure to take the time to accurately select the side the dice rolled on. In deciding what my alternative hypothesis would be, my background knowledge that dice do not clearly indicate a certain side when rolled on carpet was used to select granite as the better surface texture.

As listed in the data table, the findings showed that it was 10% more likely to roll a double on granite than carpet. 26% of the time, the roll delivered doubles on granite. 16% of the time the roll delivered doubles on carpet.

Given this data for the 50 trials each, we must reject the null hypothesis. The findings in the alternative hypothesis were confirmed by the 10% more likelihood of rolling doubles of granite than carpet. The texture of the surface does determine how likely it is to roll doubles on a pair of dice. More specifically, a smooth texture, like granite, delivered more double rolls than on a rough texture.

These results will be put to good use in making sure that I play Monopoly on the countertops rather than the carpet floor. I not only will be able to apply the findings of this experiment in my life, but also, I further grasped the concepts of the scientific method in science.

# Sources

Physical Science Department. (2020, Summer). GEY111 HOL lab manual.  Colorado: CCCOnline.  Retrieved from class website at:

<https://ccco.desire2learn.com/d2l/le/content/2768021/viewContent/29148195/View>