City Rats

Part 1: Hypothesis

Q: What is a Hypothesis?

A: A Hypothesis is a proposed explanation based on facts.

Your job is to come up with a hypothesis for the research questions presented below. Follow the bullet points in the "Assignment" section to help guide you.

Research Questions: Which Borough in NYC has the most rats?

Assignment: *provide at least ½ a page (typed) including the following information:*

1. Why are rats a problem in cities?
2. What NYC borough do you think will have the most reported rat sightings?
3. Explain WHY you think that.
4. You must provide at least **TWO** sources as part of your answer.

Need Help Getting Started?
Here are some suggested sources for background reading:

- Rats in Big Cities: [Click Here!](#)

- Rat Map of NYC: [Click Here!](#)

Part 2: Methods- Data and Planning

Step 1: Review the data!

*Take a minute to look at the data below. There are many reported rat sightings in NYC every day. Here we have the data from **ONE** day- Jan. 5, 2014.*

| Rat sightings in NYC on Jan. 5, 2014 ||
Sighting Number	Borough
1	BROOKLYN
2	BRONX
3	QUEENS
4	MANHATTAN
5	BROOKLYN
6	BROOKLYN
7	MANHATTAN
8	BROOKLYN
9	MANHATTAN
10	BRONX
11	BROOKLYN
12	MANHATTAN
13	BRONX
14	MANHATTAN

Step 2: Make a Data Plan!

Assignment: *We are making a plan for how to best analyze our data- you are not actually going to do the math yet…that comes later! For now, review the data presented and provide at least a ½ page (typed) paragraph containing the following information:*

* HINT: Remember, you need to analyze this data in a way that will help you to <u>prove or disprove </u>the hypothesis you made in part 1.

1. We have a list of rat sightings and the borough that each was in. What do you think is the best way to compare this data?
2. You will need to make a chart or graph of the data presented. Which **chart type** (bar graph, line graph, pie chart, etc.) do you think will help you best analyze this data? Explain your choice for chart type.
3. List <u>**THREE** basic statistics</u> (average, range, minimum, maximum, etc.) that you think would help you better understand your data.
   - Here are some examples of some basic statistics that may be helpful; you may use <u>up to two </u> of these examples, but you must provide at least **ONE** additional idea of your own.
     ➢ What is the range of rat sightings per borough?
     ➢ What borough has the least rats sightings?
     ➢ What is the average number of rat sightings per borough?
4. List <u>**THREE** number transformations</u> (fractions, percentage, etc.) that would help you to make sense out of your data.
   - Here are some examples of some number transformations that may be helpful; you may use <u>up to </u>two of these examples, but you must provide at least **ONE** additional idea of your own.
     ➢ What percent of the rat sightings were in Brooklyn?
     ➢ What fraction of rat sightings were in the Bronx ?
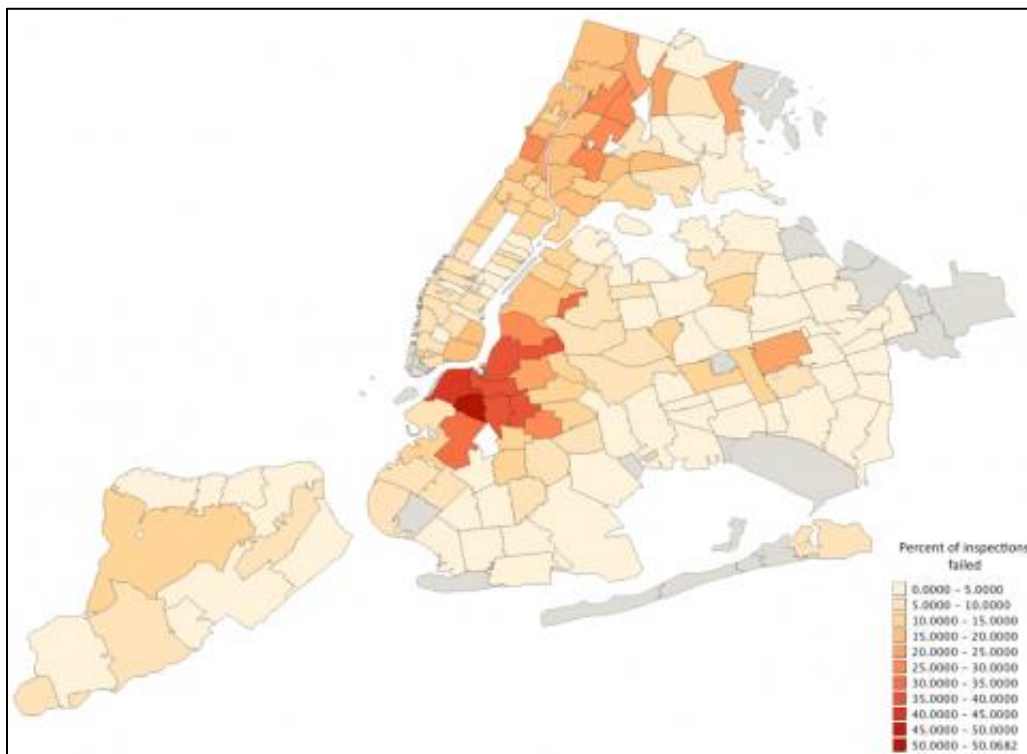   ➢ Which borough had the largest percent of the rat sightings?

Part 3: Data Analysis and Results

Assignment: DO THE MATH! Using your data plan, *provide at least 1 page (typed) including the following information.*

1. Provide a chart (drawn or made on a computer) that best displays your data.
2. Explain the basic trends we can gather from this chart(1-3 sentences)
3. Provide at least <u>three</u> basic statistic that describes your data
4. Explain what the statistic(s) are telling us about the data (1-3 sentences)
5. Provide at least <u>three</u> number transformation that helps to make sense of your data
6. Explain how this number transformation helps put your numerical data in context (1-3 sentences)

Getting ready for the next steps:

Here is a Map from the City's Rat Information Portal. Can you compare these map results to your chart and basic statistic results?

Percent of inspections failed

0.0000 – 5.0000
5.0000 – 10.0000
10.0000 – 15.0000
15.0000 – 20.0000
20.0000 – 25.0000
25.0000 – 30.0000
30.0000 – 35.0000
35.0000 – 40.0000
40.0000 – 45.0000
45.0000 – 50.0000
50.0000 – 50.0682

Part 4: Conclusions

Assignment: *provide at least 1 page (typed) including the following information:*

1. Restate your hypothesis from part 1.
2. Did the data analysis support your hypothesis?
3. Which method (chart, statistics, number transformation) was the most helpful in determining your conclusion? Why?
4. Do your findings match what other researchers have found (use the business insider report to back up your statements). If your data did not match up with the expected pattern, can you think of a reason why?
5. Can you think of another data source or methodology that would help you to add further to this research?
6. What did this project teach you about quantitative reasoning?

★ KEEP CALM AND REASON ON! ★

Data not working out? KEEP CALM! Remember, the point of this project is to build your quantitative reasoning skills, not to necessarily be "right" about everything. Here are some tips to help you through some common data "freak outs":

…**Your hypotheses was wrong-** *it's OK!!* Double check your math to be sure that your calculations are correct, and use this week's assignment to report on what you have learned.

…Your data does not match what other researchers have found. *Don't Freak Out!!* Again, double check your calculations and report on what YOU have found. Point our some potential reasons your data may not match.

…You think you chose the wrong data plan (graphs, stats, etc.). *Keep Breathing!!* This is the section of the paper where you get to explain what you would add to this project or do differently if you were to do the project again. If you think your data plan choices were incorrect, this is your chance to explain yourself- and if your really brave- give it another try!