

## **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 climactic element: air temperature or precipitation is expected to change more drastically as climate change progresses.

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

1. What is global climate change and how is it caused?
2. What are some major impacts global climate change is expected to have on NYC?
3. Which climactic element to you predict will change most drastically in the future?
4. Explain WHY you think that.
5. You must provide at least **TWO** sources as part of your answer.

### **Need Help Getting Started?**

**Here are some suggested sources for background reading:**

- Global Climate Change Basics: [Click Here!](#)
- Climate Projections for NYC: [Click Here!](#)
- NYC’s Plans to deal with Climate Change: [Click Here!](#)

# Part 2: Methods- Data and Planning

## Step 1: Review the data!

Take a minute to look at the data below from the [New York City Panel on Climate change](#). Table 1 provides projections for air temperature, precipitation and sea level; Table 2 provides projections for extreme events.

Table 1

	<b>Baseline 1971-2000</b>	<b>2020s</b>	<b>2050s</b>	<b>2080s</b>
<b>Air temperature</b> Central range <sup>2</sup>	55 °F	+ 1.5 to 3 °F	+ 3 to 5 °F	+ 4 to 7.5 °F
<b>Precipitation</b> Central range <sup>2</sup>	46.5 in	+ 0 to 5 %	+ 0 to 10 %	+ 5 to 10 %

Table 2

	<b>Extreme Event</b>	<b>Baseline (1971- 2000)</b>	<b>2020s</b>	<b>2050s</b>	<b>2080s</b>
<b>Heatwaves &amp; Cold Events</b>	# of days/year with maximum temperature exceeding: 90° F	14	23 to 29	29 to 45	37 to 64
	100° F	0.4 <sup>1</sup>	0.6 to 1	1 to 4	2 to 9
	# of heat waves/year <sup>2</sup>	2	3 to 4	4 to 6	5 to 8
	Average duration (in days)	4	4 to 5	5 to 5	5 to 7
	# of days/year with minimum temperature below 32° F:	72	53 to 61	45 to 54	36 to 49
<b>Intense Precipitation &amp; Droughts</b>	# of days per year with rainfall exceeding:				
	1 inch	13	13 to 14	13 to 15	14 to 16
	2 inches	3	3 to 4	3 to 4	4 to 4
	4 inches	0.3	0.2 to 0.4	0.3 to 0.4	0.3 to 0.5
	Drought occurs, on average <sup>3</sup>	~once every 100 yrs	~once every 100 to 100 yrs	~once every 50 to 100 yrs	~once every 8 to 100 yrs

# Part 2: Methods- Data and Planning

## Step 2: Make a Data Plan!

**Assignment:** *We are making a plan for how to best analyze our data- will 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 prove or disprove the hypothesis you made in part 1.

1. Temperature data is given in degrees F, precipitation is given in percent increase. What do you think is the best way to make these data sets comparable?
2. You will need to make a chart or graph of the data presented. Which **chart type** (bar graph, scatter plot, pie chart, etc.) do you think will help you best analyze this data? Explain your choice for chart type.
3. List **TWO basic statistics** (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 ONE of these examples, but you must provide at least **ONE** additional idea of your own.
    - Which element has the maximum predicted change?
    - What is the predicted temperature range for 2080?
4. List **TWO number transformations** (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 ONE of these examples, but you must provide at least **ONE** additional idea of your own.
    - Which element has the smallest predicted percent increase for 2080?
    - What value (in inches) is the maximum expected rain for 2080?
5. **Table 2** contains predictions about extreme events connected with each climactic element we are reviewing. How can you use this information to support your analysis?

## Part 3: Data Analysis and Results

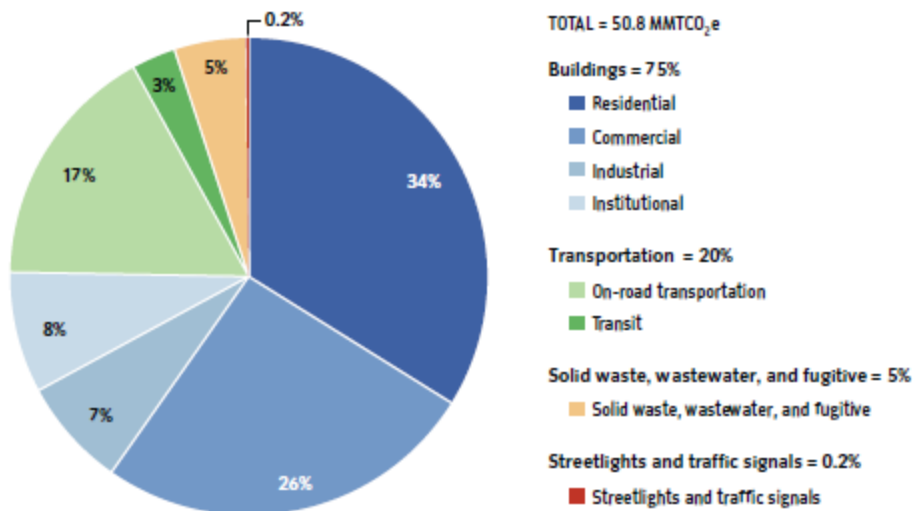
**Assignment: DO THE MATH!** Using your data plan, provide at least 1 page (typed) including the following information.

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 two 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 two 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)
7. Use information from table 2 to support your analysis.

Getting ready for the next steps:

Here is a Graph from of Greenhouse Gas (GHG) emissions in NYC from 2009- What is the City doing to combat Global Climate Change? [CLICK HERE](#) to find out!

2009 Citywide GHG Emissions by Sector



## 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 (you'll need at least **TWO** sources to show this- you can use the same sources you used to make your hypothesis).
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 out 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!