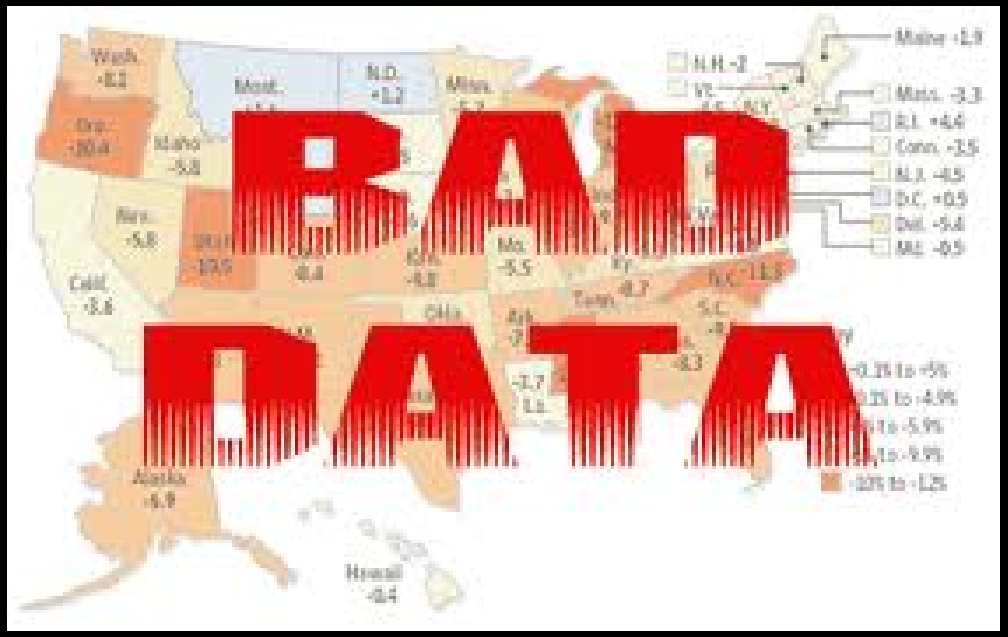
Title:	TRENDS IN THE DATA COLLECTED
Grade and Subject:	8^{th}-12^{th} grades
Number of Days for Completion of the Project:	1
Overarching Project Goals/Outcomes:	Students analyze their data! During the past couple of months, students have collected data on both the trees in their school's community and the number of cars that pass through the school's neighborhood. During the next two weeks, students will analyze the data they have spent much time and effort collecting. Students will be broken up into three groups (number of chaperones). Each group will work together finding trends in their data. The first week will be dedicated to the tree data, and the second week the car data will be analyzed. Each group will analyze each set of data, and then the class will come together as a whole and discuss their thoughts and observations.
Materials:	• Computers • Data collected (trees and cars) • Pen/pencils
Introduction:	1. Previous class' tree and car data.
Instruction/Direct Experience:	1. Analyzing data. 2. Working in a team environment with fellow scientists.
Independent Activities:	Class will be broken up into teams and as a group will discuss and analyze their data.
Assessment:	Student's team working and data analysis skills.
Follow-up	Following the completion of data analysis, students will conclude their project with the discussion and conclusion section of their project. A PowerPoint of the entire project will be the grand finale of the project!

How to Display Data Badly

By Howard Wainer



Focus

- The “Dirty Dozen”
- Methods of bad data display
  - Showing data
  - Showing data accurately
  - Showing data clearly

Showing Data

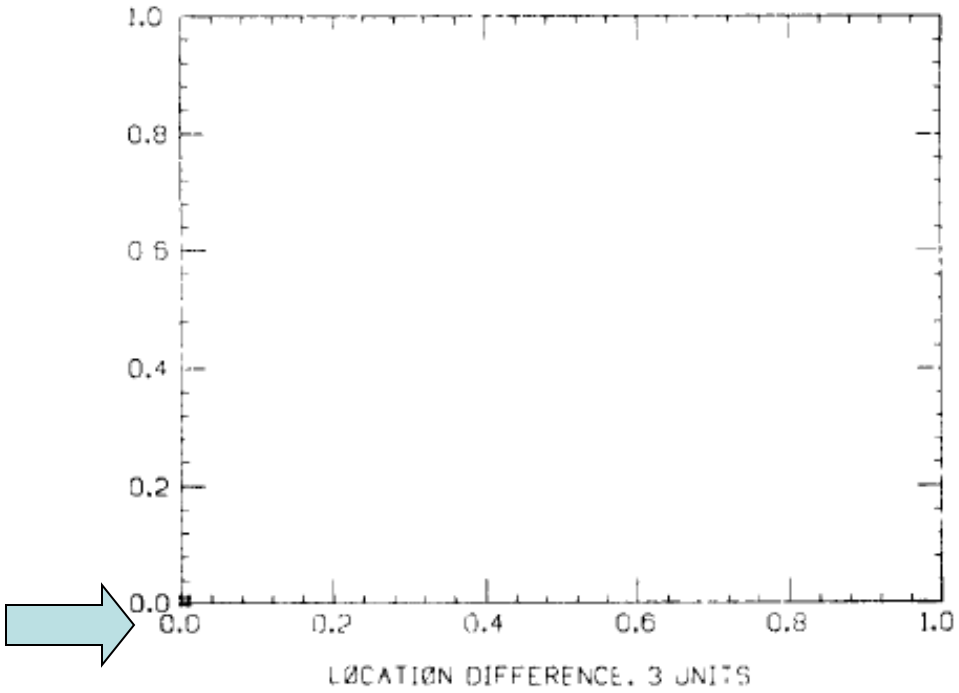
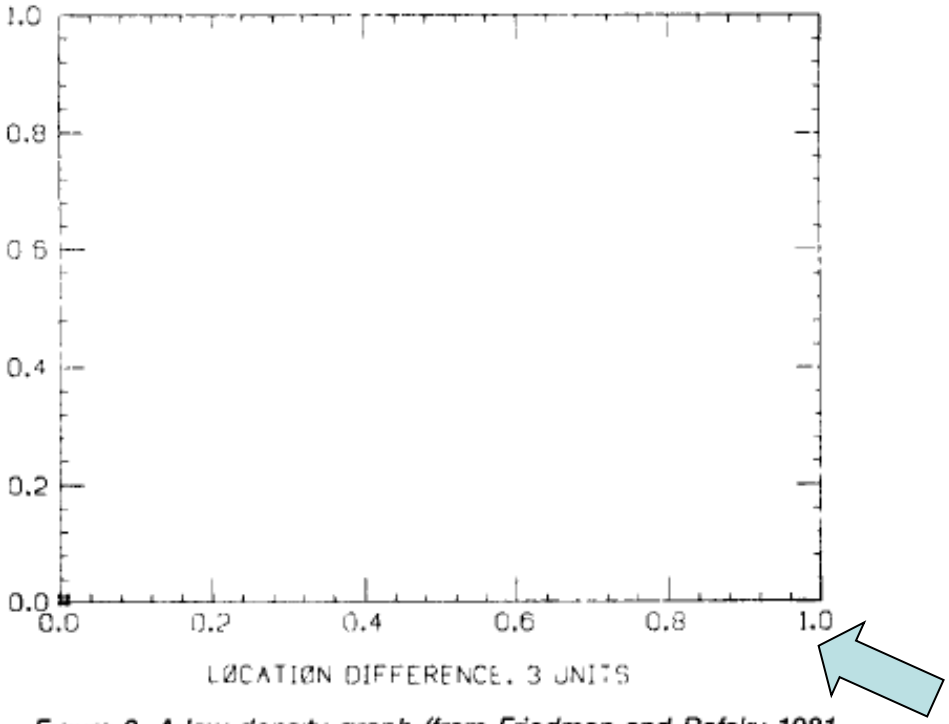


Figure 2. A low density graph (from Friedman and Rafsky 1981 [ddı = .5]).

Showing Data



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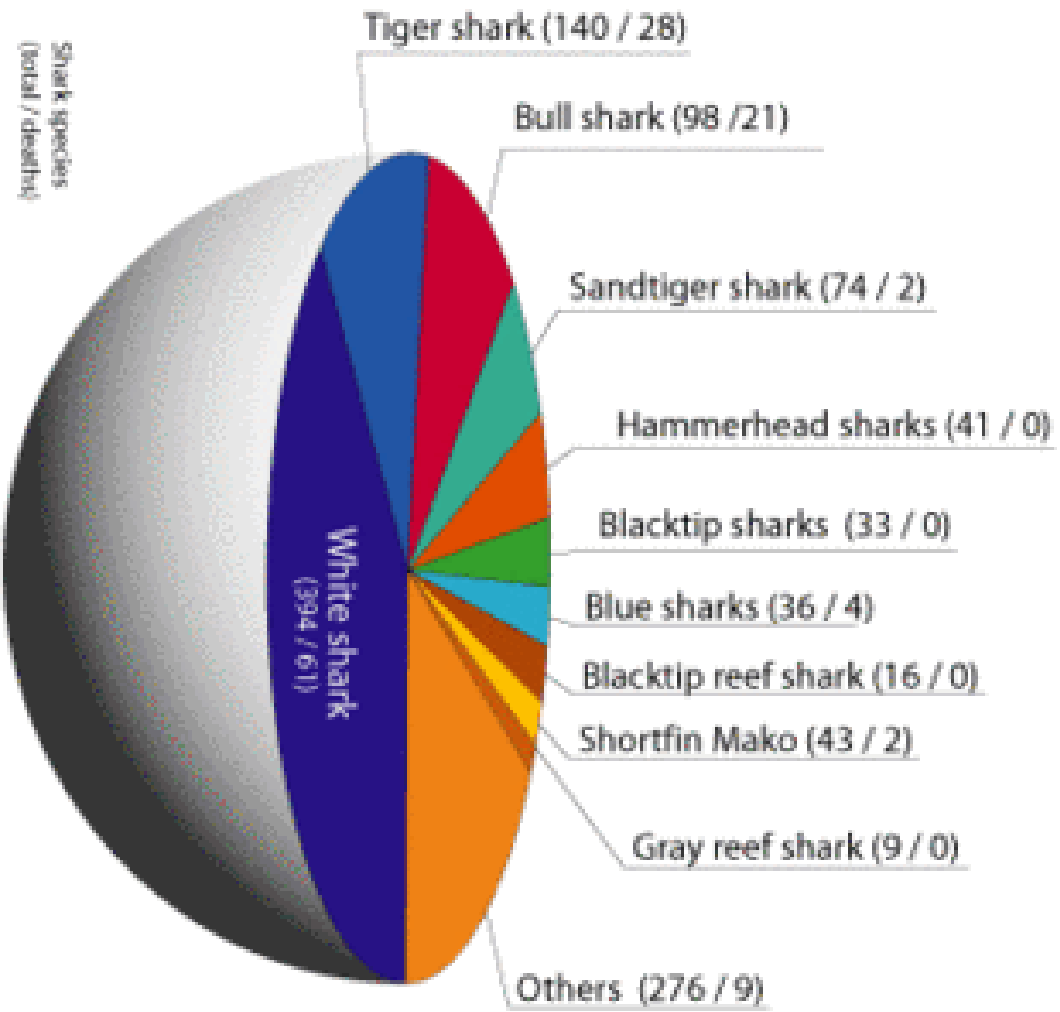
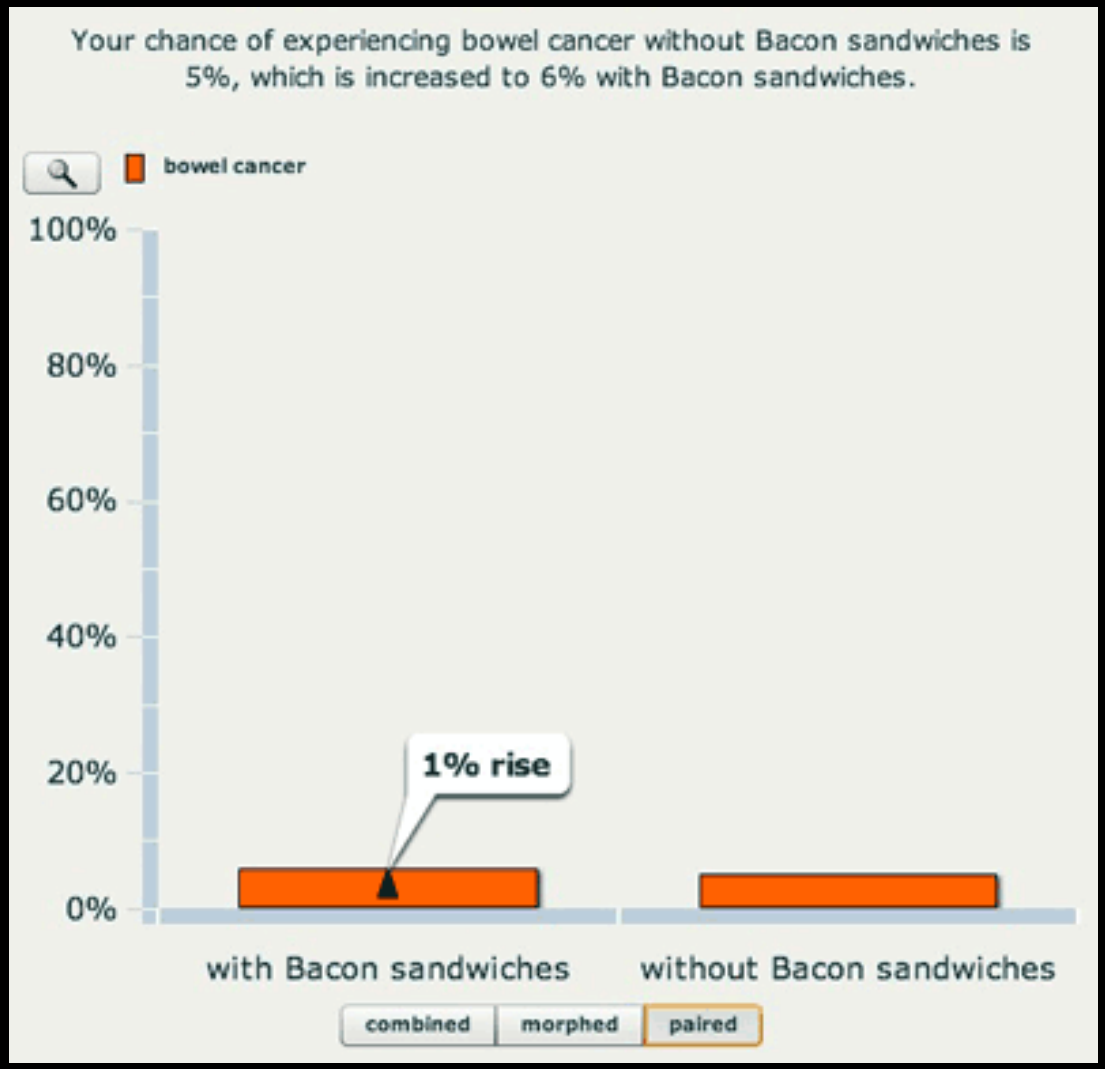
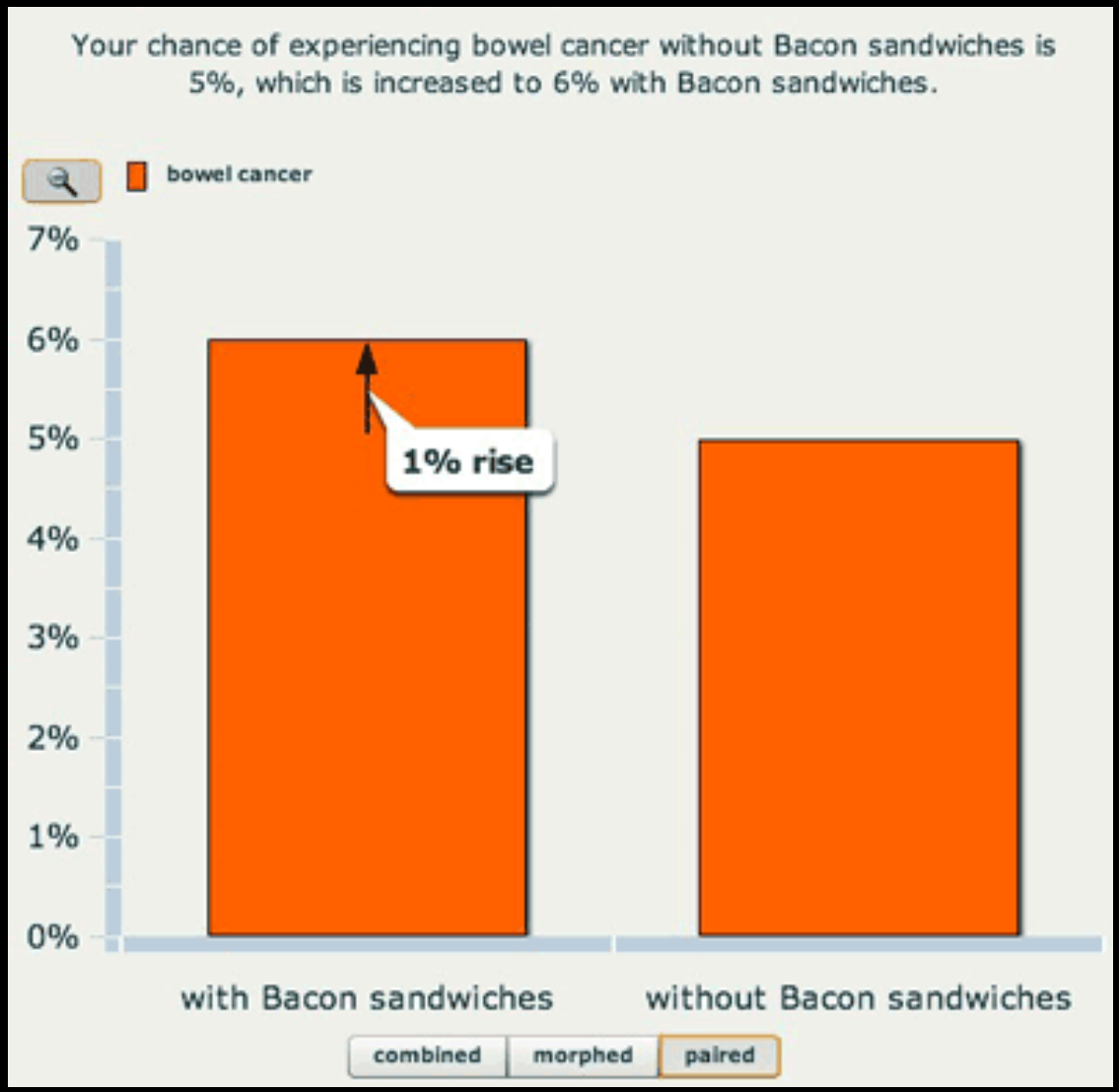
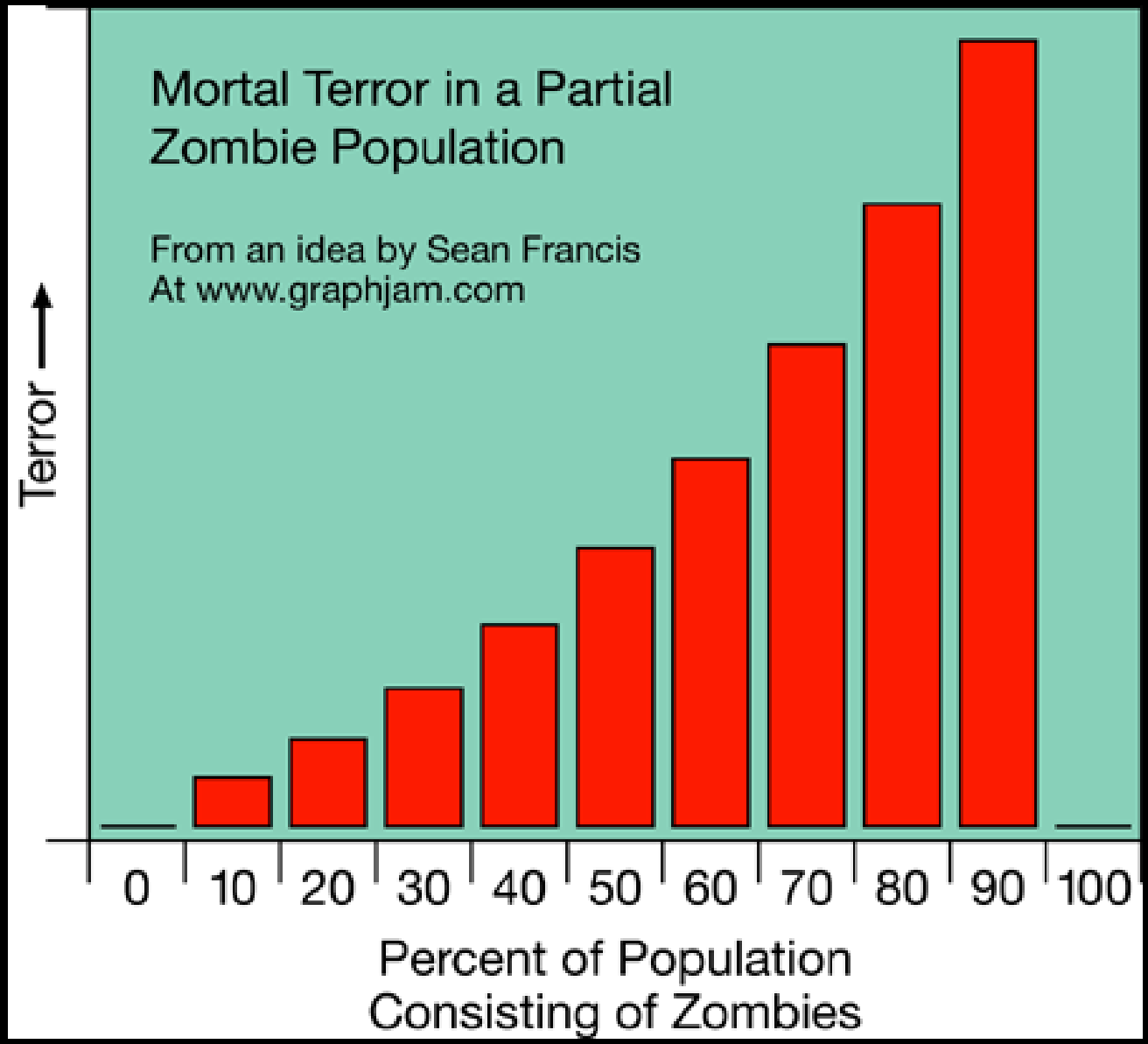

Shark species
(total / deaths)
Tiger shark (140 / 28)
Bull shark (98 /21)
Sandtiger shark (74 / 2)
Hammerhead sharks (41 / 0)
Blacktip sharks (33 / 0)
Blue sharks (36 / 4)
Blacktip reef shark (16 / 0)
Shortfin Mako (43 / 2)
Gray reef shark (9 / 0)
Others (276 / 9)
White shark
(394 / 61)

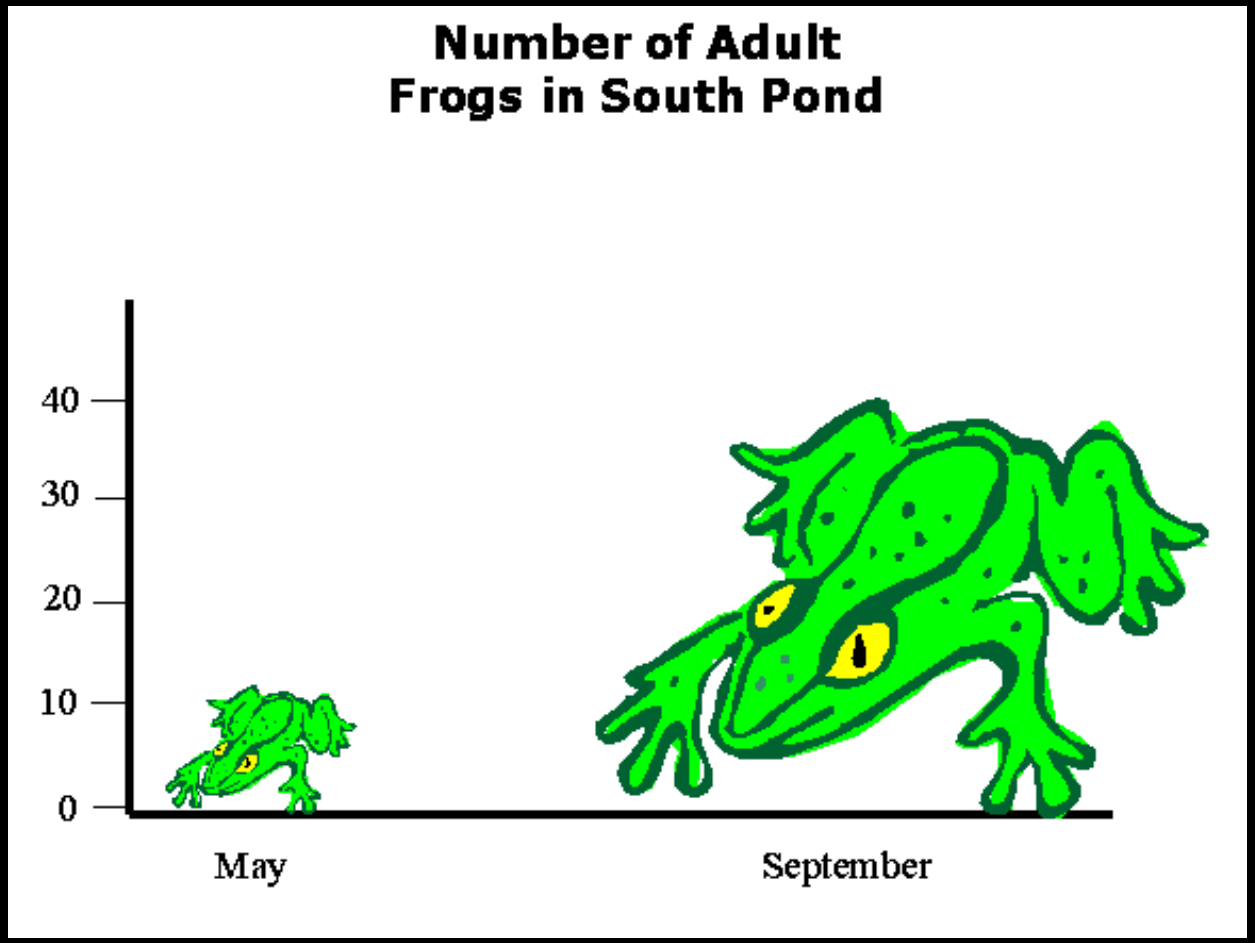
Using Scale


Your chance of experiencing bowel cancer without Bacon sandwiches is 5%, which is increased to 6% with Bacon sandwiches.
bowel cancer
100%
80%
60%
40%
20%
0%
1% rise
with Bacon sandwiches
without Bacon sandwiches
combined
morphed
paired


Your chance of experiencing bowel cancer without Bacon sandwiches is 5%, which is increased to 6% with Bacon sandwiches.
bowel cancer
7%
6%
5%
4%
3%
2%
1%
0%
1% rise
with Bacon sandwiches
without Bacon sandwiches
combined
morphed
paired

Accuracy


Mortal Terror in a Partial Zombie Population
From an idea by Sean Francis
At www.graphjam.com
Terror
0
10
20
30
40
50
60
70
80
90
100
Percent of Population Consisting of Zombies


Number of Adult
Frogs in South Pond
40
30
20
10
0
May
September

Showing Data Clearly

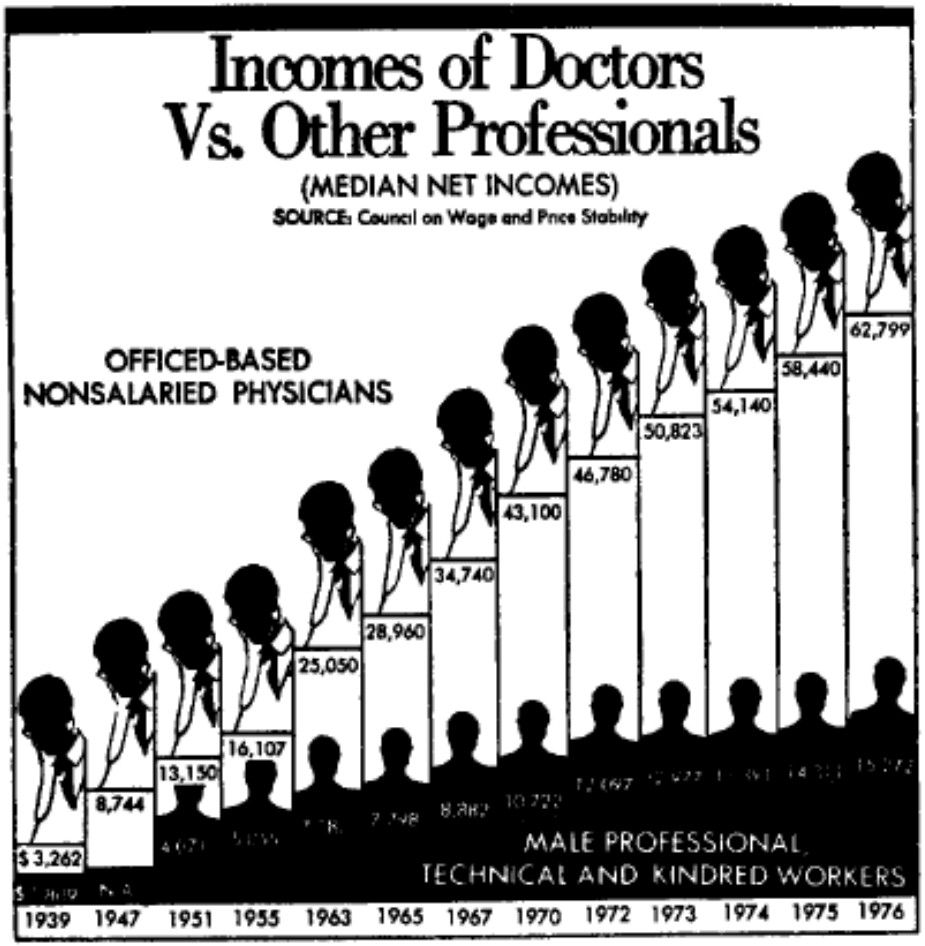


Figure 13 Changing scale in mid-axis to make exponential growth linear (© The Washington Post)

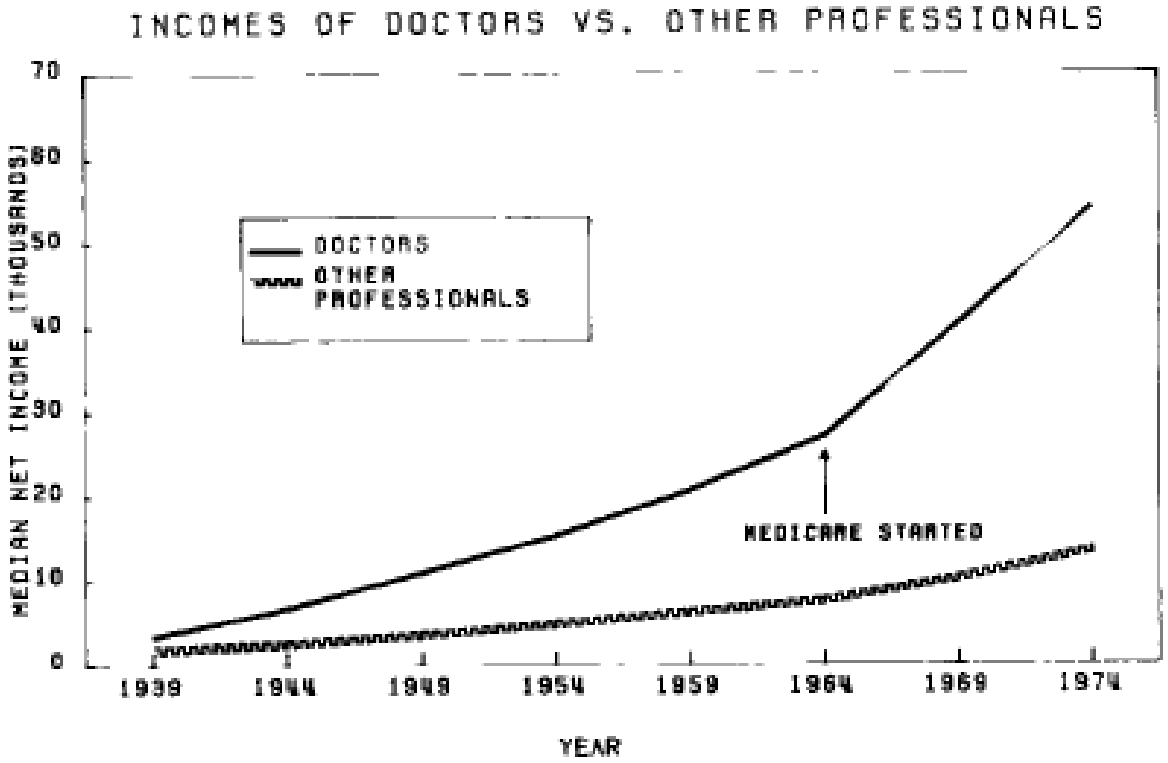


Figure 14 Data from Figure 13 redone with linear scale (from Wainer 1980)

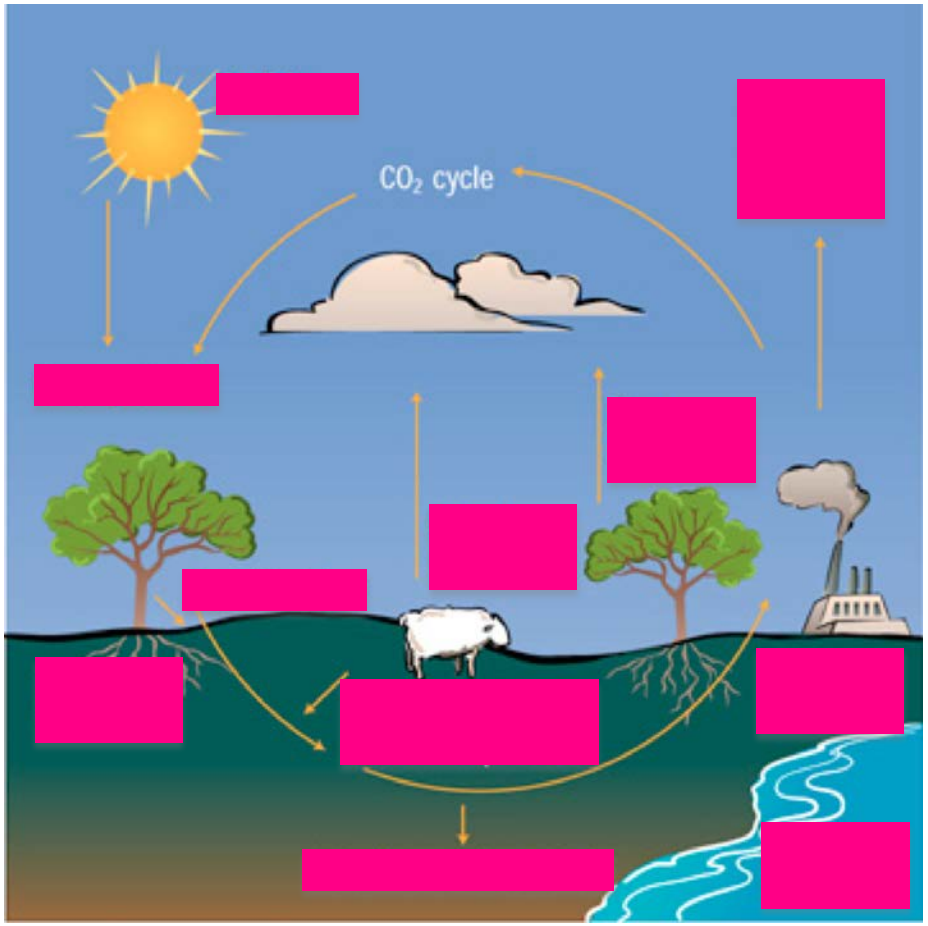
Aim Today

- Look at our data and see what needs improvement
- Fill out accompanying worksheet
- We want our data to be accurate as well as look good!

Where we started… and where we're going

A look at how far we've come!!

The Carbon Cycle



http://www.windows2universe.org/earth/climate/images/carboncycle_sm.jpg

Brainstorming…

- What is the relationship between the carbon dioxide emissions given off by the cars and people in the neighborhood around Teachers Preparatory School and the carbon sequestered by the trees in the same area?
- Are there enough trees to compensate for the carbon dioxide emitted by the neighborhood cars and people?

Hypothesis…

- The larger the tree, the move CO_2 it will remove from the atmosphere.
- Each tree has a limit to the amount of CO_2 it can compensate for within the atmosphere.
- The height and circumference of a tree will affect the amount of CO_2 the tree can take in.

Materials…

- Measuring Tape
- Clickers
- Clip boards
- Pens/Pencils
- Digital Camera
- Math Formulas
- Data Tables

The Tree Data Table…

- Tree Location
- Circumference (m)
- Height (m)
- Healthy?

Carbon Footprints of "Big" Trees

DATE: _____

TEAM: _____

_____

_____

_____

	Tree/Address	Photo?	Circumference (m)	Height (m)	Healthy?
1		Yes / No			Yes / No
2		Yes / No			Yes / No
3		Yes / No			Yes / No
4		Yes / No			Yes / No
5		Yes / No			Yes / No
6		Yes / No			Yes / No
7		Yes / No			Yes / No
8		Yes / No			Yes / No
9		Yes / No			Yes / No
10		Yes / No			Yes / No
11		Yes / No			Yes / No
12		Yes / No			Yes / No

The Car Data Table

- Type of Car
- Tally for Each Type of Car
- Total Cars Counted

Question: How do the number of cars affect CO_2 levels in our community?

Date: _____

Time Slot: From_____ to _____

Location: (Streets)_____ and _____

Team: _____

_____

_____

_____

_____

Vehicle Type	Count	Total	Notes (ex. # of people in the car)
Coupe (2-door)			
Sedan (4-door)			
Van			
Bus			
Truck			

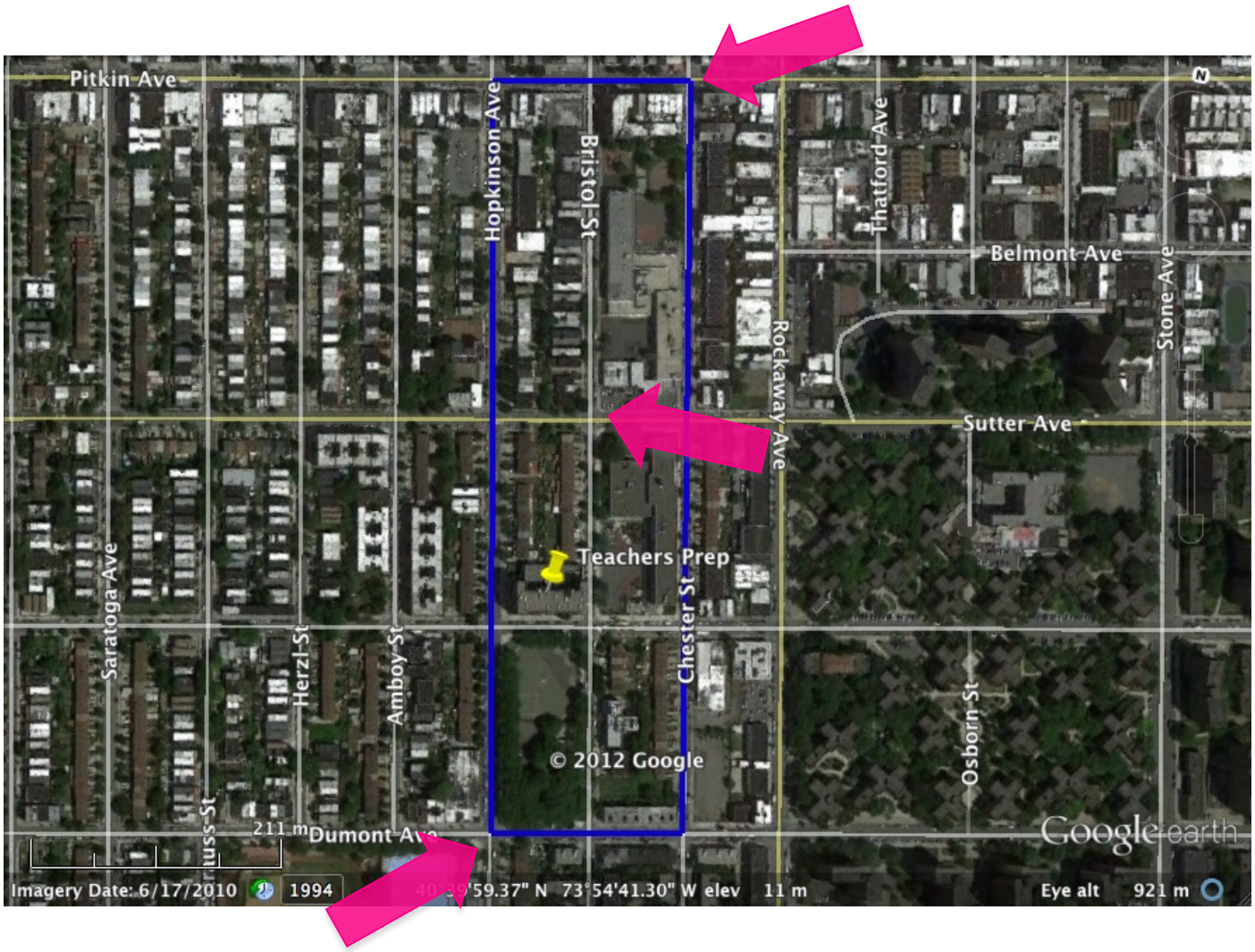
*Label Hybrids as H if you can identify them

Total Number of Cars: _____

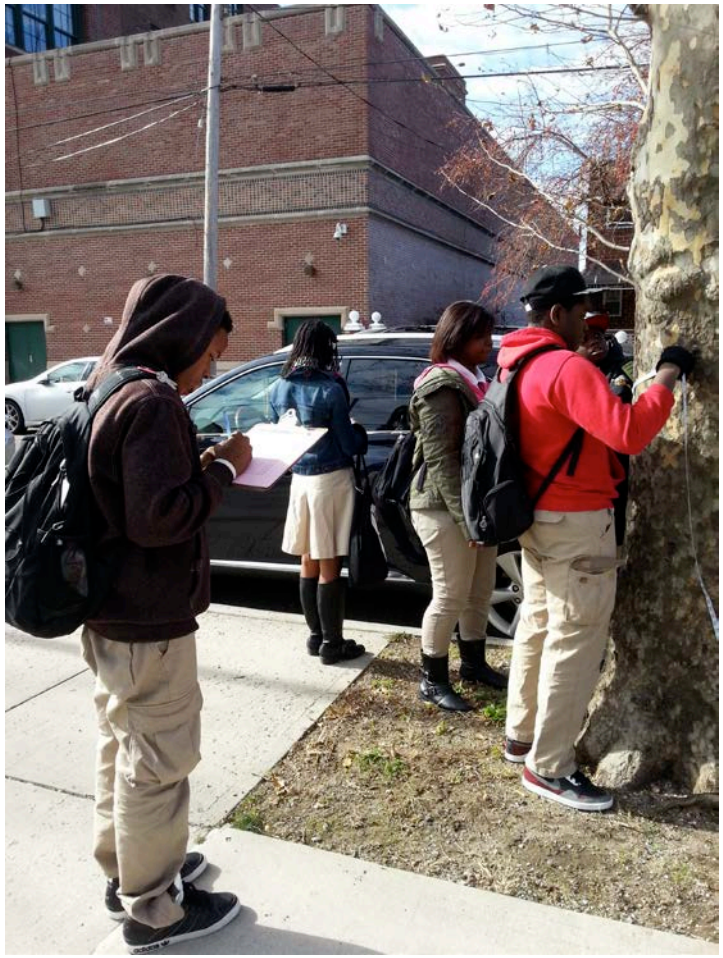
Where are we?

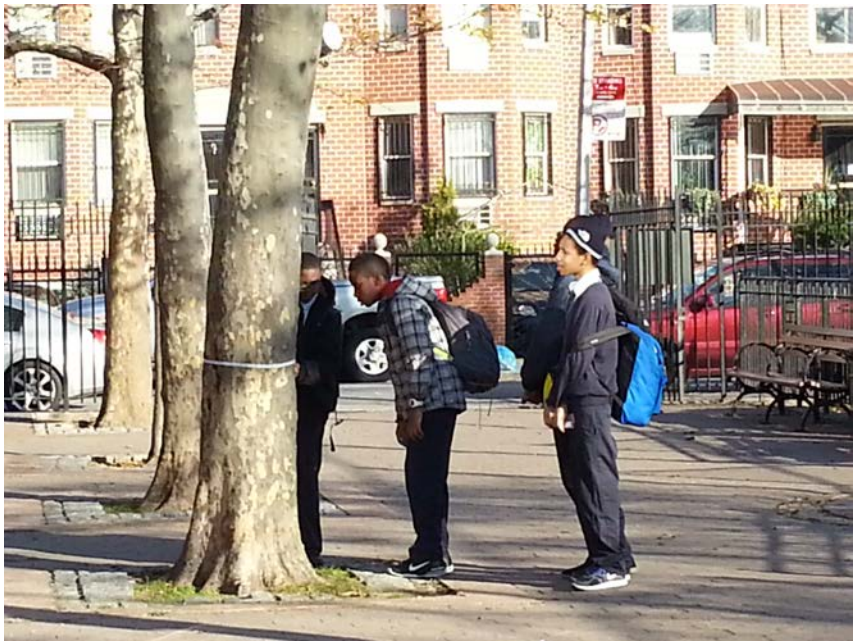

Fishers Island
Gardiners Island
Long Island Sound
New York
Teachers Prep
© 2012 Europa Technologies
Image © 2012 TerraMetrics
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2012 Google
Google earth
40°49'19.88" N 73°22'48.97" W elev 31 m
Eye alt 209.23 km

The Neighborhood: Where you Measured…



Data Collection!





What Next?

- Discussion
- Conclusion
- BUT FIRST WE NEED
  - THE RESULTS!

Carbon dioxide Compensation & Local Tree Populations in Bushwick, Brooklyn

Kevin Ribot; Jacob Torres; et al.

Academy of Urban Planning, Brooklyn, New York

ABSTRACT

Carbon sinks are limited within urban areas. In Brooklyn trees may be considered one of the top sinks of carbon. Compared to nearby rural and suburban areas the difference in numbers of trees to human population is visibly different particularly in underprivileged neighborhoods. Students investigated one square mile surrounding their high school campus to quantify the carbon uptake of local trees in comparison to populations. Results show that the current number of trees is sufficient to compensate for the population but given new plantings are a rare occurrence suggests this balance will not be maintained in the future.

METHODS

Students worked in teams to collect data on the locality, circumference, and height of trees within a square mile surrounding their campus in Bushwick, Brooklyn. The following calculations were then used to calculate volume, weight and carbon compensation.

$A = c^2$

$V = h * A$

$W = V * d$

Assuming the density of the tree to be 700kg/m³

Carbon Footprint of the Tree

*0.264 * W/ 0.18 = 1.5 * W*

Assuming a 2000 calorie diet with an intake of 0.52kg/day with an output of 0.7kg/day

Students then utilized census data on local populations to determine the whether the trees were compensating for basic human carbon output. According to the 2000 census data (2010 census data unavailable at time of creation of poster) the population density for New York City was 26,403 per sq/mile.

RESULTS

According to our calculations, which were limited to carbon dioxide contributions per person and did not incorporate vehicle and additional sources of carbon dioxide, the number of trees within the square mile surrounding the Bushwick Campus are enough to sustain current populations. Should there be a decrease in the number of large trees or an increase in population this balance will not be sustainable. There is a need for additional planting of trees within the Bushwick neighborhood to combat imminent population and transportation output needs.

AKNOWLEDGEMENT

We would like to thank Ms. Susannah Ceraldi, Academy of Urban Planning, Bushwick, Brooklyn, and Ms. Kimberly Handle, NSF GK12 fellow, Brooklyn College *City-as-Lab.*

Name _____

Date _____

What's wrong with this data?!

1. Is there something that you noticed was missing from our tree data?

2. What would you do to improve the presentation of the data?

3. What have you learned from a closer investigation of the tree data?

4. Are there any trends you observe in the tree data?

5. What conclusions can be drawn from the data so far?