

Understanding and Interpreting Data

For this activity, students explore real data for example human population growth, populations of cities and student debt among other topics. Discussions center on the characteristics of the graphs of real data, understanding how to read graphs, and the log scale.

Students viewed a TedTalk on interpreting data

http://www.ted.com/talks/david_mccandless_the_beauty_of_data_visualization

Instructor introduced linearity and explained $y=mx+b$

- What are some examples of things we did in class that shows the difference between linear and nonlinear?
 - o Spheres
 - o Beach balls and saddle shape homework
- Showing a graph, a discussion was started including the meanings of the axes and units. Students were asked to guess what the data might be referring to. Once it was established that the graph dealt with human population, other questions were posed.
 - o Students were asked what they notice about the graph, where there were noticeable changes and what that may mean in terms of history ect.
- Showing another graph of the most populous cities, students were asked where population distributed, what are the largest cities, and what the relationships between these large cities may be (What do they notice? What connections can they make?)

After working with some examples of graphs, the instructor introduced logarithmic scales as a way to read graphs.

- Students were directed to look at the scales used on a graph and use mathematical calculation (log) that reduces the size of the number

Further discussion regarding statistics, graphs, and information where students discussed the importance of understanding the source in which data came and being aware of not simply accepting data and instead being critical in your interpretation.

Data exploration

Using climate change data students organized a large data set, choosing interesting portions of the data, and created posters to communicate their ideas.

Gallery walk

- Students walked around the room and viewed the other posters.
- Critical feedback – students were asked to give examples of critical feedback before the gallery walk began. Examples of, “nice picture”, “good job” were deemed as insufficient and unhelpful feedback. Instead students were asked to comment on the poster’s title, representation of the data in picture form, labeling of axes, clarity of information, and units, among other things they noticed. Using post-its, they gave critical feedback about their peers’ posters.
- Small group discussion – students discussed possible changes they could make to improve their posters based on the feedback they received.

Order of magnitude problems

Instructor discussed examples of reasonable approaches to answering order of magnitude problems. Students were asked to choose one or two of the following questions:

- What is the area of the Pacific Ocean?
- What is the thickness of paper?
- What is the weight of your foot?
- How many gallons of gasoline are used in the US each year?
- How many revolutions will the wheel of your car make when you drive from Montclair to Washington DC?
- How many K12 teachers are there in NJ?

Students were instructed to come up with reasonable estimates and to record the key points in their approach to answering these questions.

Midterm

Some of the contents of this module was “covered” on the midterm. Instructors could use what appeared on the midterm as an in-class assignment.