# Interacting with Data

There are many ways to illustrate data. How we represent data can make the data easy to understand or it can confuse. If the data is well represented, the graph can stand alone, needing little explanation, if any. The most common types of graphs are shown below, along with an explanation of the types of data that are well represented with the specific graph. Keep in mind when using color that many people are colorblind and have difficulty distinguishing red from green, green from brown, blue from purple, etc. and those colors shouldn't be used next to one another.

Ethnicity, 2005-06
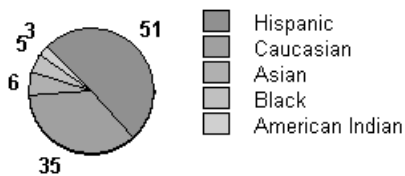
Pie Charts

Pie charts are used to represent the parts, percentages or proportions, of a whole. The size of each part displayed as a percentage makes the relationship among the parts and between the part and whole readily apparent.

Bar Graphs

Bar graphs are an excellent format to display descriptive data. They can be displayed with horizontal or vertical bars, and usually show the relationship between an x and y axis. Stacked bars show the elements that comprise the total. They can be used to display comparisons, rankings and change over time.
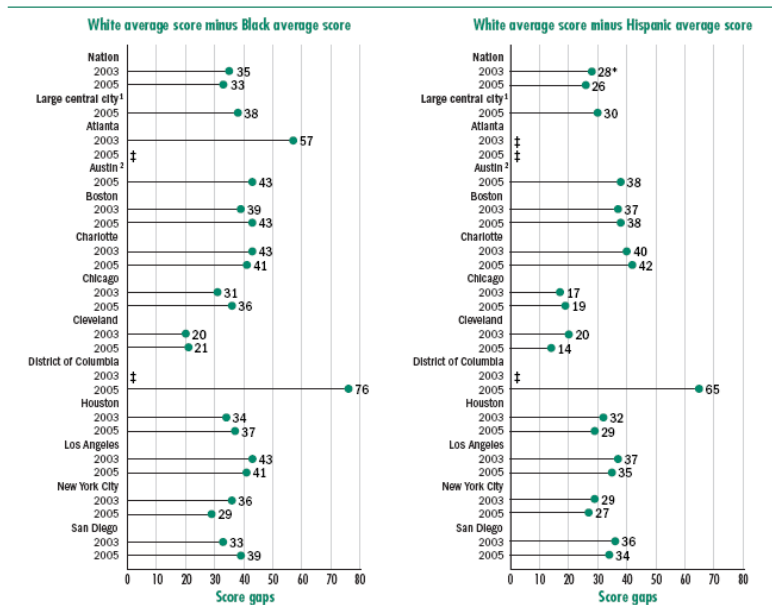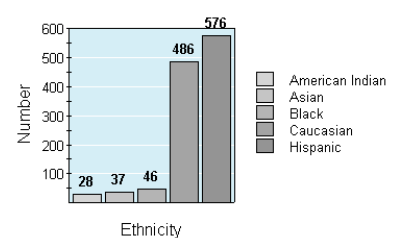
‡ Reporting standards not met.
* Significantly different from 2005.
[1] Data for large central city schools are not included for years prior to 2005 because the application of the definitions of the types of location has changed. For 2005, "large central city" includes nationally representative public schools located in large central cities (population of 250,000 or more) within a Metropolitan Statistical Area (MSA).
[2] The district did not participate in 2003.
NOTE: Score gaps are calculated based on differences between unrounded average scale scores.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2003 and 2005 Trial Urban District Mathematics Assessments.
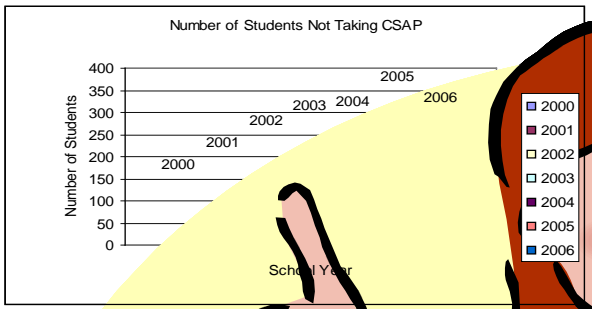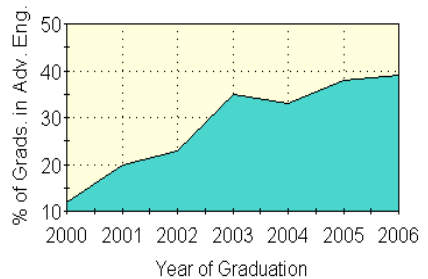
Enrollment in Sleepy Town High Schools

Enrollment: 800, 600, 400, 200
School Years: 2000 2002 2004 2006
North High
Center High
South High
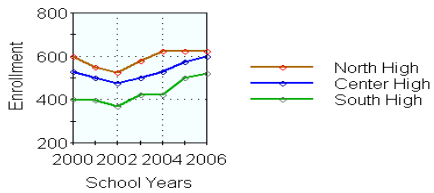
Line Charts
Line charts provide lots of possibilities. One of their best uses is to display change over time. They are can be more helpful than bar charts if complex data is involved. They are useful for displaying trends and comparisons. The x axis usually displays the numbers for the time period; the y axis usually displays the numbers for what is being measured.

Area Graphs
Area graphs can be used to show how something changes over time. They have an x-axis (horizontal) and a y-axis (vertical). Usually, the x-axis has numbers for the time period, and the y-axis has numbers for what is being measured. Area graphs can be used when you're plotting data that has peaks (ups) and valleys (downs), or that was collected in a short time period.

Graduates Completing Advanced English

% of Grads. in Adv. Eng.: 50, 40, 30, 20, 10
Year of Graduation: 2000 2001 2002 2003 2004 2005 2006

Number of Students Not Taking CSAP

Number of Students: 400, 350, 300, 250, 200, 150, 100, 50, 0
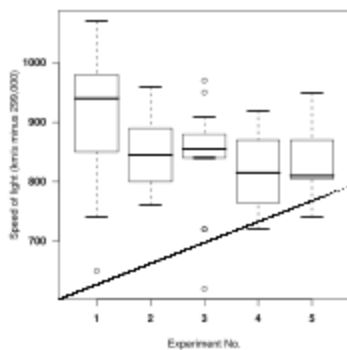2000, 2001, 2002, 2003, 2004, 2005, 2006
School Year

Pictographs
Pictographs are another type of graph that presents a visual display of data, creative and eye-catching.

Scatter Plots
Scatter plots display relationships between two or more variables. They indicate correlation and comparisons, as one point in time, or over time.

Old Faithful Eruptions

Waiting Time Between Eruptions (Min)
Eruption Duration (Min)
1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Box and Whisker Plots
Box and Whisker plots turn raw data into the "shape" of the score distribution for ease of visual interpretation. The boxes display the distribution of scores, while the whiskers indicate the range above and below the median. These are what go home to parents about students' CSAP performance.

Speed of light (kms minus 299,000)
1000, 900, 800, 700
Experiment No.: 1 2 3 4 5

Resources Used

Box plot , Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/, downloaded 6-7-07

Create a Graph, National Center for Education Statistics (NCES),
        http://nces.ed.gov/nceskids/graphing/index.asp, downloaded 3-12-06

Creating Pictographs with Excel, by Edwin H.B. Tam, downloaded 3-12-06
        http://users.vol.net/edwintam/tips/1/TIP1.HTM

Scatterplot , Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/, downloaded 6-7-07

Using Data and Statistics, http://www.nathleague.com/help/data/data/htm, downloaded 3-12-06

Bernhardt, V. L., (1998). Data analysis. Larchmont, NY: Eye on Education, Inc.

Wellman, B. & Lipton, L. (2003). Data driven dialogue: A facilitator's guide to collaborative inquiry. Sherman, CT: MiraVia.