Memorable Graphs
Facilitator Instructions

Overview
Participants look at graphic examples of how a fact or data set can be presented. They discuss which they find most effective, and why.

When to Use It
When you have key facts or data that you want to communicate to officials or the general public, and you need inspiration or ideas for how to present the data visually.

Suggested companion activities: See Communicating With Numbers.

Steps

1. **Launch the activity:** They say a picture is worth 1,000 words. Does anyone have an example of a graph or visual of a fact that that really made an impression on you? What, and why? (Prompt with a prepared example or two.)

2. **In groups of 4-6:** These cards describe a community situation with data, and then show different graphic ways of representing the data. Which shows the message most effectively? Why? Arrange the graphs from most to least effective. (Note: Sets 6 and 7 have a different purpose; see notes on right and in each set.)

3. **Debrief:**
   - Which were most and least compelling? Was there disagreement?
   - How would you improve any of these?

After all groups have reported back, discuss: What makes a good visual representation of data? What makes a bad or confusing graph? Take notes on flip chart paper.

Distribute the Strategies for Making Memorable Graphs handout. Is there overlap between the group’s ideas and those ideas on the handout? Encourage people to add their own wisdom to the handout.

For the Facilitator
If the group seems ready, you can immediately follow by having participants practice sketching draft graphs using their own data. If the group isn’t yet comfortable with the math and science involved in their situation, try other activities first.

Smart Moves
- Talk it out
- Play with different ways to show it and say it

**Skill:** Think creatively and critically about different ways to graph facts & data.

**Time:** 30-45 minutes

**Preparation**
Choose which card set you will use:
1. Children with Asthma
2. Incinerator Ash
3. Truck Traffic
4. Pesticides and ADHD
5. Landfill Expansion
6. Thyroid Cancer Incidence
   (balancing trend-showing vs. credibility)
7. Turning a Brownfield Site Into a Park
   (choosing a combo of data for visual impact)

Copy card sets and cut up along dashed lines. Come with an example or two of a graph that made an impression on you.

**Materials & Prep**
Card sets (one per small group)
Strategies for Making Memorable Graphs (4 pages, 1 set per participant)
Optional: Flip chart and markers for debrief
Memorable Graphs
Strategies

Strategies for Making Memorable Graphs

1. Choose Your Message and Graph Type

Choose the message you want your graph to support. A description of a compelling fact or trend might lead to a powerful image. Try different ways of showing a percent, ratio, or raw number. Sharp increases and simple ratios make striking visuals.

Choose a graph type that makes the most sense for your data. Here are some common types:

- **Bar/Column**: Compares amounts in different categories.
  
  *Example*: Levels of PAHs in different soil samples.

- **Pie/Circle**: Compares parts of a whole, everything adds to 100%.
  
  *Example*: % of expenses in different categories of a city budget.

- **Line**: Shows changes over time or distance.
  
  *Example*: Monthly arsenic levels in a well for a year.

- **Scatterplot**: Shows a possible relationship between two different measurable things.
  
  *Example*: Lead levels in a person’s blood vs. distance from the person’s house to a junkyard.

- **Infographic**: Uses icons or an image to show a ratio or relationship.
  
  *Example*: Community members in Boston did a health survey and found that 81 out of 355 children had asthma. They found this was about the same as one in four.
Strategies for Making Memorable Graphs

2. Make a Rough Draft

Choose a title that sums up what’s on the graph, and why the reader should care.

Label it. Make it clear what each axis and graphic represents. Label key points to give the reader context.

Choose a scale that makes it clear how the data support your message. However, if it looks like you’re exaggerating, it could hurt your credibility.

Put your data in order. Most data sets will have a natural order, from earliest to latest, or nearest to farthest. If there’s no natural order, sort the data from largest to smallest.

Categories in order by size
Proportional word size
Labels on the chart, not in a legend
Numbers included
Strategies for Making Memorable Graphs

3. Avoid Pitfalls and Make Trade-Offs

Check all the parts of the graph for meaning. A spreadsheet program can create a graph, but only a person can judge if it makes sense.

![Cancer Mortality in Ohio (2000-2008)](image1)

*Line helps readers see change in mortality over time.*

![Ohio Counties with Highest Cancer Incidence (2004-2008)](image2)

*Line makes it seem like cancer incidence is decreasing. But in reality there is no “trend.” The data are from counties scattered across the state, from the same range of years.*

**Pie chart pitfalls.** Use pie charts only if the categories are distinct (no overlaps) and the numbers add to 100%.

## Detailed color graphics vs. black & white.

Color and pictures make an attractive final product for a big poster. Plan ahead, though: they can be expensive, and don't photocopy well in black & white.

## Comprehensive data vs. key points.

Gauge your audience's interest and attention span. Will a typical reader take the time needed to read all the data you have? For most audiences, just focus on the most convincing stats.

**Health Survey Results**

*Check all that apply.*

- Asthma 51%
- Nausea 18%
- Dizziness 34%
- No health problem 30%

**Measure Diffs**

*Cancer incidence for children under 15 by type of cancer.*


DATA: National Cancer Institute, Division of Cancer Control and Population Sciences, Surveillance, Epidemiology and End Results Program.
Strategies for Making Memorable Graphs

4. Revise and Polish

Use visuals that support your message. Make lines or colors bolder for more serious results. Replace bars with little icons, like trucks or skulls or dollar bills. A map can help readers put the data in context.

Adjust for people’s instincts. Many people expect that more is better, so if more is bad, make that clear.

Help people see the pattern. Use a key or legend if needed, but it’s faster to understand a chart if you put labels, data, and graphics together so keys aren’t needed. If your data are scattered, you can add a line to show the trend. Use computer spreadsheet software to make it accurate.

Final check. Look at your graph for five seconds. Look at it again from across the room, in a mirror, or upside down. Can a reader get the message quickly? Edit to strengthen the features that communicate your message, remove things that don’t. Look again; make final tweaks.
Set 1: Children with Asthma

In 2006, the Boston Urban Asthma Coalition did a health survey in the Dorchester neighborhood. The survey found that 81 out of 355 children (22.8%) had been diagnosed with asthma. The national rate is 10.8%.

Local vs. National Asthma Rates

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<th>% of Children</th>
<th>Local</th>
<th>National</th>
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</thead>
<tbody>
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<td></td>
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<tr>
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<td>25%</td>
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</tbody>
</table>

Child Asthma Rates

- National
- Dorchester

One in Four Dorchester Kids Have Asthma!

Double the asthma means double the absences

Data Sources: Community survey, http://matracking.ehs.state.ma.us/Health_Data/Pediatric_Asthma.html
Set 2: Incinerator Ash

A local landfill company wants to accept ash from an incinerator. The ash has 4.3 ppm of mercury. Normal soil in the area is only 0.18 ppm mercury. Neighbors don’t want mercury levels in their soil to increase.

Data Source: http://www.americanhealthstudies.org/wastenot/wn318.htm
Projections show that a proposed new power plant would cause a tenfold increase in truck traffic on a small county road.

Data Source: Hypothetical
One study showed that children with higher-than-median levels of the pesticide *dimethyl triophosphate* were almost twice as likely to develop ADHD as children with lower or undetectable levels of the pesticide.

Tenfold increase in metabolized chlorpyrifos associated with doubling of ADHD in children

Data Source: http://pediatrics.aappublications.org/content/125/6/e1270
A landfill operator wants to increase their trash intake from 830 tons per day (258,960 tons per year) to 1,600 tons per day (499,200 tons per year).

Landfill owner wants to double the trash coming into Southbridge!

Data Source: Landfill in Southbridge, MA
Since 1990, thyroid cancer rates have been rising more dramatically in women than in men.

Some of these graphs show a clear trend, but critics might say the graphs have been manipulated to exaggerate the effect. Which do you think is both clear and credible?

Data Source: www.cancer.org/Research/CancerFactsFigures/ACSPC-031941
A group in the Little Village neighborhood of Chicago wants the city to fund a plan to turn a local brownfield site into a park. They are comparing their proposed park to two other recently-approved parks. This group has lots of data about cost and community need. Which combination of data is most effective?

Data Sources: census.gov, lvejo.org