

OVERVIEW

BIG IDEA

Graphs tell a story, so they must be clear, accurate, and compelling.

OBJECTIVE

3.6 Create a clear, accurate, and compelling graph to depict data.

AGENDA

1. Problems with Graphs
2. CDC: Graphs & Charts Reading
3. Steps to Graphing
4. Practice & Peer-Evaluate

HOMEWORK

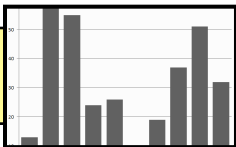
Find a data set that is in table form and create a graph telling the story of the data in a clear, accurate, and compelling way.

LESSON 3.6

Graphing

SUMMARY:

This lesson will provide students with some basic skills and practice on graphing data. Students will begin by pointing out problems with a sample set of graphs to identify what they already know about what makes a strong graph. Then they will read a brief overview of graphs and charts published by the CDC. Next they will focus on the idea that graphs “tell a story” by trying to identify the purpose and main conclusions (essentially the story) in a sample of graphs. Finally, they will practice determining the most appropriate type of graph for a data set and actually create their own graphs in the context of the issue of drinking and driving.



Lesson 3.6 Instructor Guide

MODULE 3: DRUGS & ADDICTION

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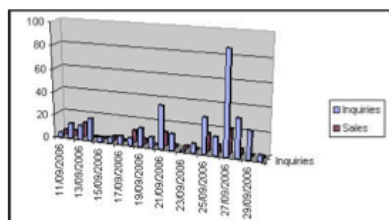
LESSON 3.6

Graphing

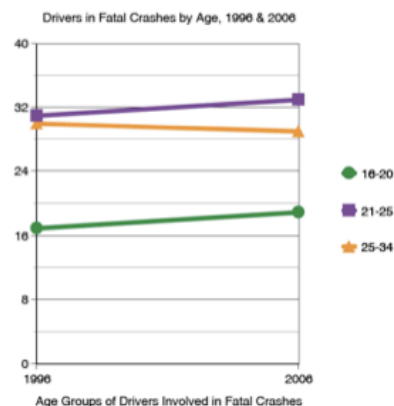
Obj. 3.6: Create a clear, accurate, and compelling graph to depict data.



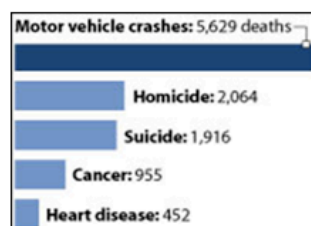
Examine each graph below and write down any problems you notice. These could be errors, a necessary component that is missing, confusion in how data is presented, or weaknesses in the set-up of the graph.



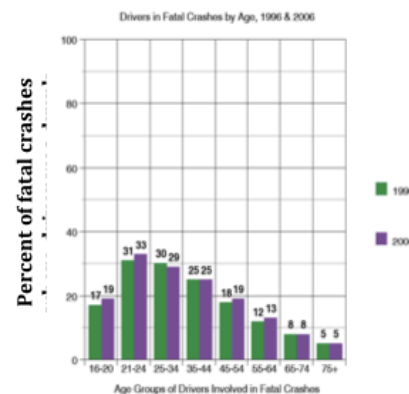
1) Problem(s):



3) Problem(s):



2) Problem(s):



4) Problem(s):

DO NOW:

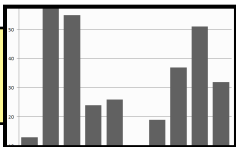
Possible Answers (many other answers may work; answers will vary):

1) 3D effect makes data hard to read, dates along x-axis are difficult to read quickly, no y-label scale, no title

2) No title, confusing—what do numbers represent (deaths among whom and when?)

3) No y-axis label, a line graph is perhaps not the most logical for a data set that only contains two x-axis points (years in this case)

4) Strongest graph among all these, however the y-axis scale makes seeing the data and the relative differences between bars quite difficult



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MODULE 3: DRUGS & ADDICTION

DISCUSS

With a partner, share the problems you found with each of the graphs.



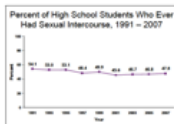
Data tells a story; sometimes these stories can be quite interesting! Read the CDC handout "Using Graphs and Charts to Illustrate Quantitative Data." Then, for each of the example graphs in the handout, tell the story. Focus on the purpose and big conclusion.



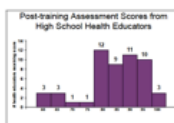
Graph 1:



Graph 2:



Graph 3:



Graph 4:



Graphs must be clear, accurate, and compelling in order to tell the story of the data. Read the following guidelines on creating a clear, accurate, and compelling graph.

If your graph is not CLEAR, you lose your credibility!

- 1) Choose the relevant data to graph
- 2) Choose the best type of graph to show data (line, bar, pie, double bar, scatter plot)

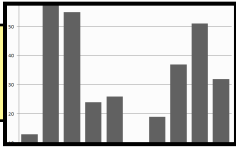
If your graph is not ACCURATE, everyone is lost!

- 3) Create a TITLE that explains the data
- 4) Add label (with units) on the X-AXIS
- 5) Add label (with units) on the Y-AXIS

If your graph is not COMPELLING, nobody cares!

- 6) Choose a strategic scale to use most of the graphing space, but do not stretch or shrink your scale so that it misrepresents your data.
- 7) Graph the data, using signals (ex: colors, patterns) to show differences in the data

READ: This handout will be a basic review, unless students have not yet learned basic graphing skills. Scaffold by supplementing or increasing rigor as needed. For advanced students, focus on pushing them toward a very high level of rigor as they determine the story of the graphs used as examples in this handout.



Lesson 3.6 Instructor Guide

MODULE 3: DRUGS & ADDICTION

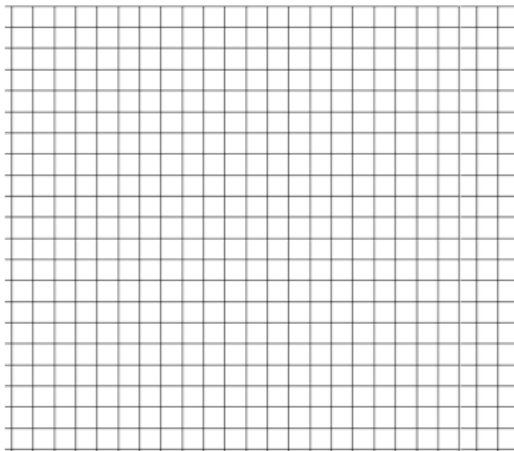


Examine the data in the table below. Follow the steps listed on the previous page to create an accurate, clear, and compelling graph (you decide on the best type!) to show differences in percent of total drivers involved in fatal crashes with BAC .08 or higher for different Age Groups for the year 1996 and 2006.

Drivers in Fatal Crashes With a BAC of .08 or Higher, by Age, Gender, 1996 and 2006

Drivers Involved in Fatal Crashes	Total Drivers					
	1996			2006		
	Total Number of Drivers	BAC .08 or Higher		Total Number of Drivers	BAC .08 or Higher	
		Number	Percent of Total		Number	Percent of Total
Total	57,001	12,348	22%	57,695	12,491	22%
Drivers by Age Group (Years)						
16-20	7,824	1,359	17%	7,286	1,350	19%
21-24	6,205	1,950	31%	6,454	2,145	33%
25-34	12,889	3,837	30%	11,223	3,259	29%
35-44	10,955	2,765	25%	10,310	2,595	25%
45-54	7,127	1,272	18%	9,201	1,746	19%
55-64	4,237	512	12%	5,864	753	13%
65-74	3,319	275	8%	3,022	229	8%
75+	3,068	145	5%	2,954	139	5%
Drivers by Sex						
Male	41,376	10,240	25%	41,975	10,078	24%
Female	14,850	1,963	13%	14,655	2,168	15%

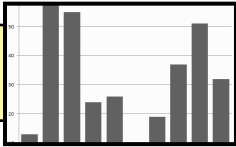
Source: CDC



THINK: Teach students the skill of marking up a graph (or encourage them to use this if they have already learned). By circling the variables that must be graphed, students will be able to tame the wild data set down to a manageable number of data points. In doing this, they will also begin to visualize how the data would be best graphed. This is a difficult cognitive process for many, so be patient and encourage students to try different methods (even use trial and error) to help get the “feel” for graphing data.

THINK: The best method to graph the data required is a: **DOUBLE BAR3 GRAPH.**

Some students may not arrive at this method. That is okay! Part of the process of learning to manipulate data is practicing and trial/error. Have extra graph paper on hand, as many students may realize they need or want to re-start after they get started. It can be annoying to have to erase pencil marks!



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MODULE 3: DRUGS & ADDICTION



Trade graphs with a partner and use the following checklist to evaluate their graph. Then write additional comments below. Try to come up with at least one complimentary comment and one constructive comment.

Type of Graph: _____

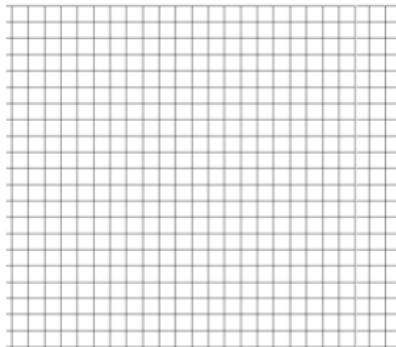
Trade graphs and check that your partner's graph meets each standard:

- ☐ descriptive title that explains data clearly
- ☐ x-axis label is clear & includes units
- ☐ y-axis label is clear & includes units
- ☐ Scales begin at 0 & have even intervals
- ☐ Maximum scale allows graph to fit entire space
- ☐ Double bars are grouped and evenly spaced
- ☐ Colors or shading differentiate data

COMMENTS:



Find another set of data that interests you and only exists in table form. Graph the data (you may choose to graph all of it or just smaller subset) in the space below.



ASSESS: Encourage students to provide one positive and one constructive comment to their partner.

HOMEWORK: The purpose of this assignment is to provide students with another opportunity to practice the skill of graphing, in a context that is both interesting and “real-world” to them.