Glossary of Chart Types

There are many ways to visualize data. This glossary provides an overview of some common chart types you may encounter in historical documents. Each chart entry includes a basic definition, a description of what kind of information or argument the chart is commonly used to display, and one or more visual examples from FRASER® (the Federal Reserve Bank of St. Louis digital library of economic history).
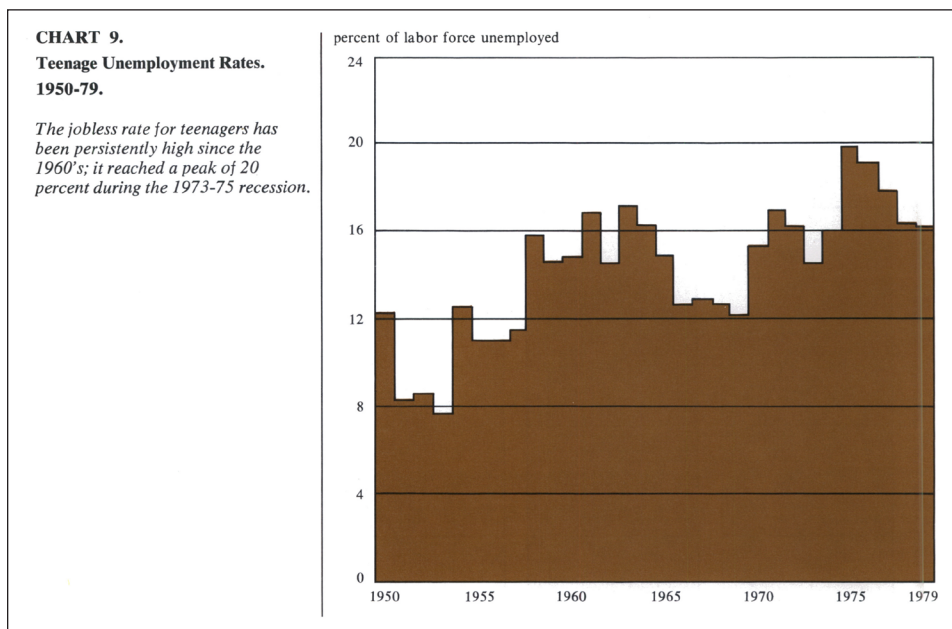
Bolded terms indicate terms defined in this glossary.

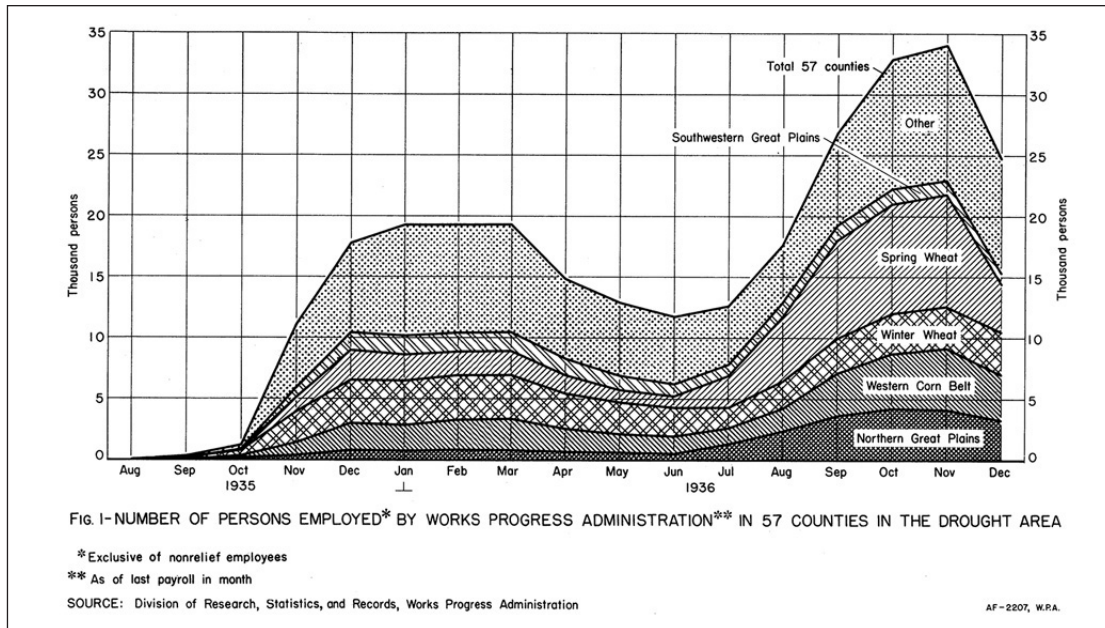Sources of the Example charts begin on page 14.

Some chart types are not included because of their scarcity in the FRASER collection. If you would like to suggest a chart you think would enhance this glossary, please contact eva.k.johnston@stls.frb.org and we will consider adding it.

Area chart: A variation of a **line chart** in which the space underneath the line(s) has been filled in or shaded (Examples 1 and 2).

Area charts are usually used to compare multiple values that add up to a total (see Example 2), but they can also be used to emphasize the volume of a given measurement (see Example 1).
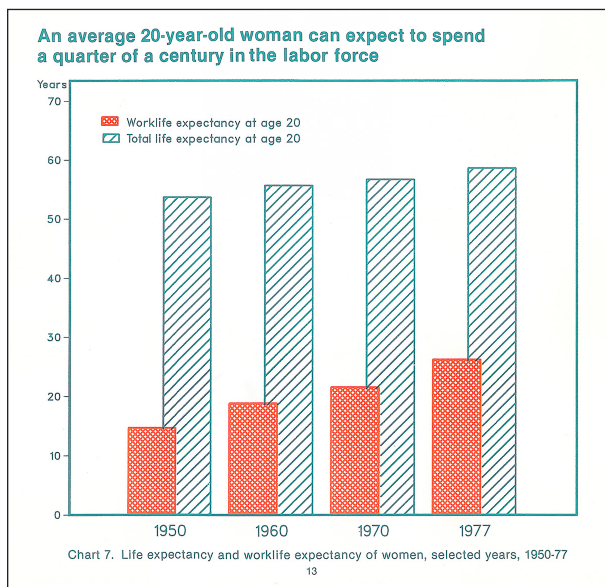

CHART 9.
Teenage Unemployment Rates. 1950-79.

The jobless rate for teenagers has been persistently high since the 1960's; it reached a peak of 20 percent during the 1973-75 recession.

Example 1: Area Chart

Example 2: Area Chart, Multiple Values

Bar chart: A chart using vertical or horizontal bars proportional to the values they represent (Examples 3 to 6). The direction of the bars may or may not be meaningful (see Example 6). *Also known as* a bar graph.

Bar charts are useful for showing comparisons of similar or related data. A bar chart with two or more datasets (see Example 3) can easily show changes within one dataset and differences between datasets.
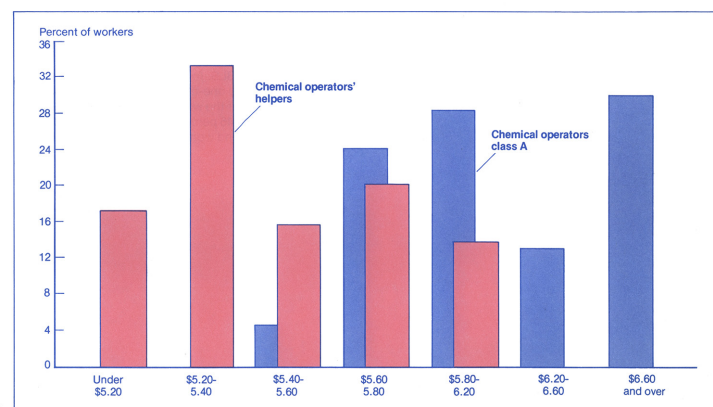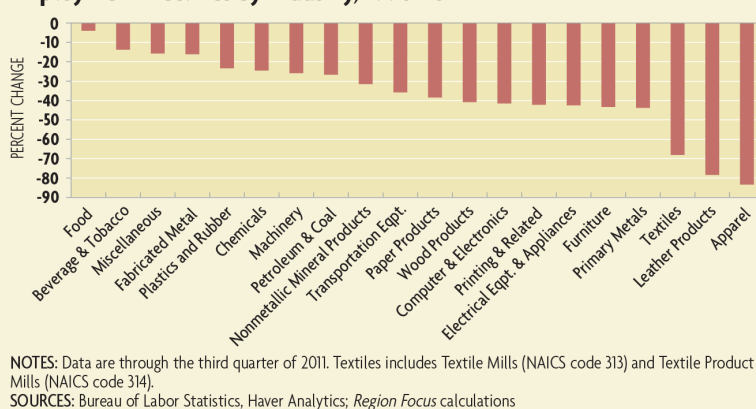

Example 3: Bar Chart
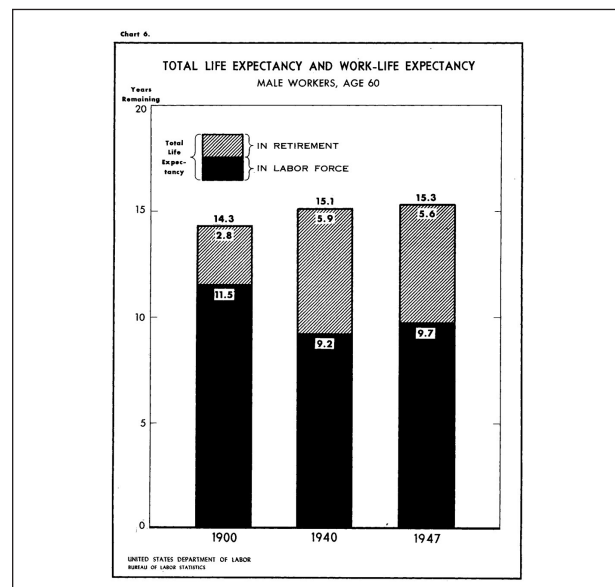
Example 4: Stacked Bar Chart

Chart 8. Earnings distributions for chemical operators and helpers in industrial chemicals establishments, Chicago metropolitan area, June 1976

Example 5: Bar Chart, Histogram

Employment Declines by Industry, 1990-2011

NOTES: Data are through the third quarter of 2011. Textiles includes Textile Mills (NAICS code 313) and Textile Product Mills (NAICS code 314).
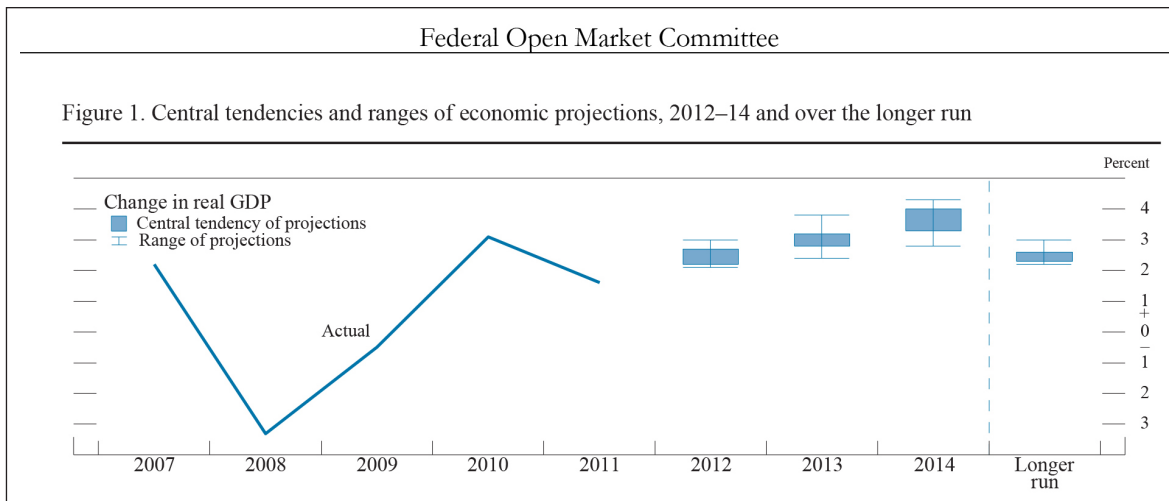SOURCES: Bureau of Labor Statistics, Haver Analytics; *Region Focus* calculations
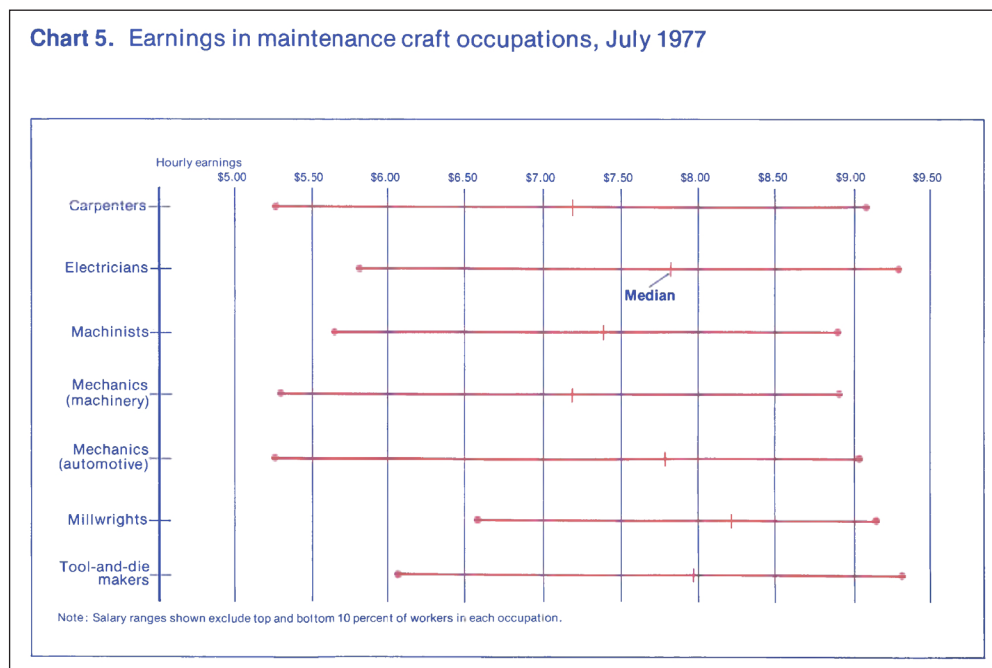
Example 6: Bar Chart

A stacked bar chart (see Example 4) shows changes in the composition of subgroups or component measurements within a given measurement. It is better at showing changes within a dataset rather than across datasets.

A histogram is a bar chart that shows the distribution of values over ranges (such as 0-5, 5-10, and 10-20; see Example 5).

Box plot: A graph that uses a box and lines to show the distribution of data: The box indicates the first through third quartiles. The lines that extend on either side of the box, often called "whiskers," indicate the maximum and minimum values of the data (Example 7). Sometimes a line is included in the box that indicates the median. *Also known as* a box-and-whisker plot or a box-and-whisker diagram.

Federal Open Market Committee

Figure 1. Central tendencies and ranges of economic projections, 2012–14 and over the longer run

Example 7: Box Plot

Chart 5. Earnings in maintenance craft occupations, July 1977

Example 8: Box Plot, Min-Max-Average

A type of box plot that depicts only the median and range (Example 8) is called a min-max-average chart.

Box plots are useful for showing the central trend of a dataset with numerous observations. A max-min-average chart shows where the median of the dataset falls in relation to the **distribution**. In both types, the location of the median along the data line can show whether the data points are more concentrated in one area of the distribution.
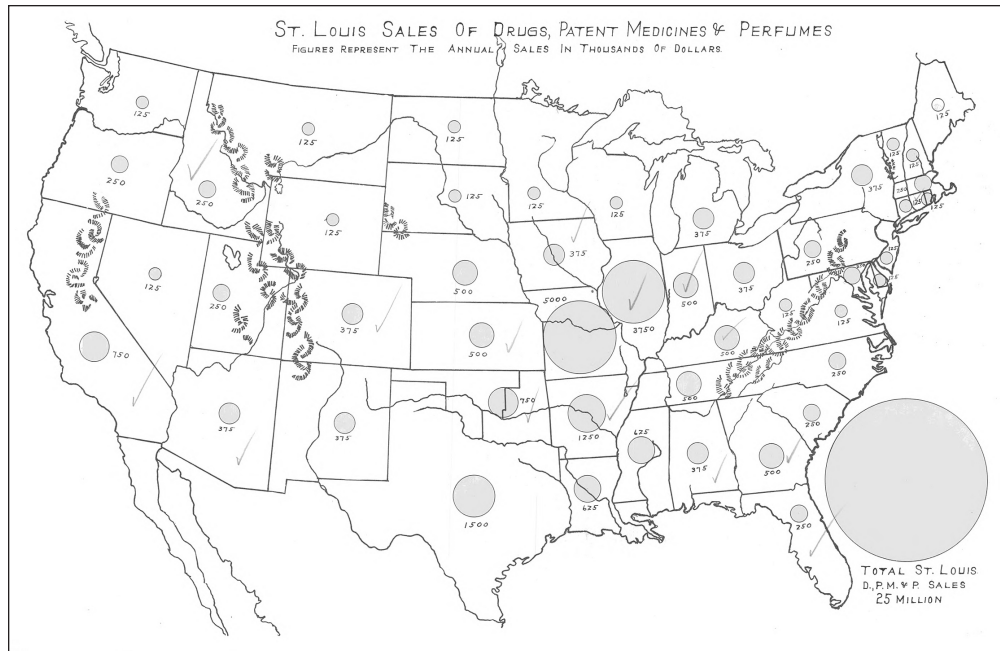
Example 9: Bubble Map

Bubble map: A type of cartogram (a **map** that shows statistical information) that shows the measurement of a given variable as proportionally sized "bubbles" in geographic regions (Example 9).

Bubble maps can quickly show variation of data across states, regions, or countries and allow for easy comparison between any two areas on the map. Unlike a **choropleth map**, a bubble map uses bubble size instead of color to indicate values.

Choropleth map: A **map** that shows variations in data across a spectrum by using different colors or, more commonly, different hues of the same color (Example 10). This kind of map visually represents values of data in geographic regions or subregions such as states or counties.

A choropleth map can easily show ranges of values across and inside geographical boundaries. Usually a darker or more intense color indicates a higher value.

Diagram: See **infographic**.

Dot plot: A graph that plots each value of a variable as a single dot and that groups values together (Example 11).

Dot plots are used to show clusters and outliers in datasets and are clearest when used for datasets with few data points. A dataset with a larger number of data points might be more clearly represented with a **box plot**.
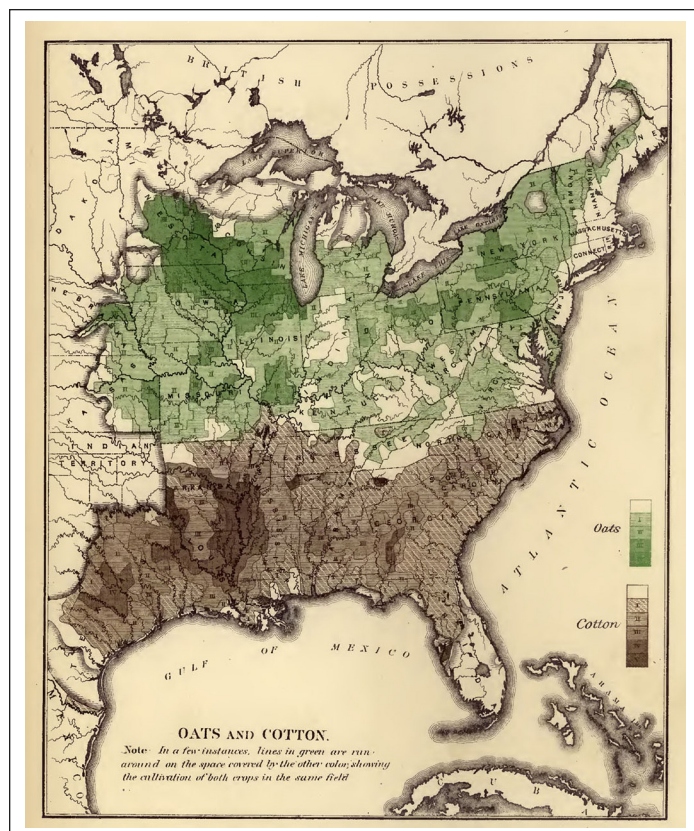
Example 10: Choropleth Map: The Range, and, within the Range, the Degree of Cultivation of Certain Principal Crops (1870)

NOTE: The following notes appear on the original map: Explanation of Scales: The no. of bushels, bales or pounds produced in each county is divided: 1st by the No. of inhabitants, 2d by the no. of Acres of improved land. The two quotients are multiplied together, and the square root of the product is taken as the measure of the importance of the crop to the county and of the county to the crop of the country. The counties are then grouped by natural gradation from lowest to highest (No. 1 upwards). Note: The Shaded Lines in Black indicate the outside limit of a population of 2 or more to the square mile. The shading points towards the regions which have a population of less than 2 to the square mile."

In a few instances, lines in green are run around on the space covered by the other color, showing the cultivation of both crops in the same field.
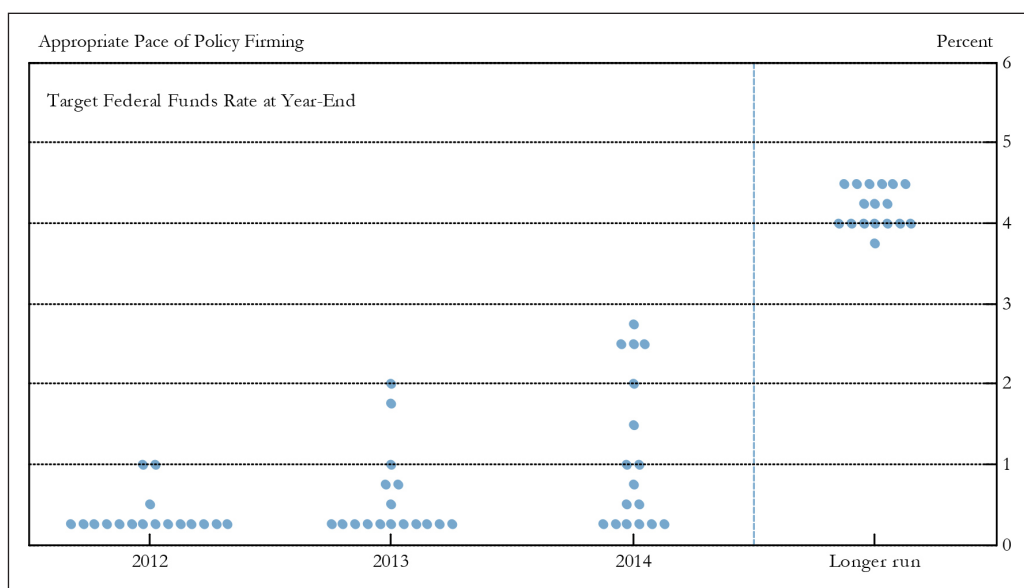

Example 11: Dot Plot
NOTE: In this example, each data point is one dot and each vertical group of dots is one time period.

Hub-and-spoke chart: A data visualization used to represent people or things (the hubs) and the connections between them (the lines, or "spokes"; Example 12).

A hub and spoke chart is more often used for qualitative (descriptive) data rather than quantitative (statistical or numerical) data. Connecting spokes and hub nodes (the point where they intersect) may be color-coded or standardized by size or shape or individually labeled. These charts are helpful for showing complex interrelationships.
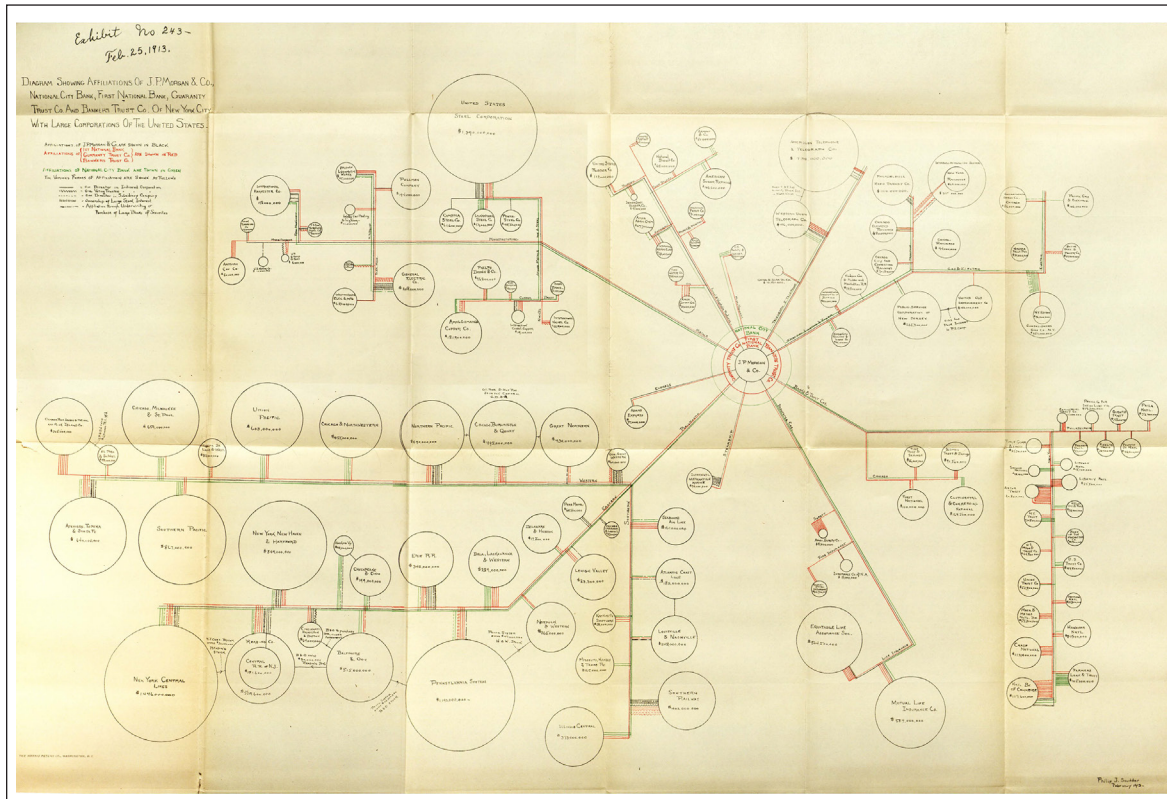
Example 12: Hub-and-Spoke Chart

Infographic: A visual representation of a process, situation, structure, or explanation intended to convey information quickly and clearly. *Also known as* a **diagram** (Examples 13 to 15).

An infographic mixes text and images to represent information more clearly than a text-only description or a graphical representation of data alone. Infographics are useful for showing flows of information, materials, or people or for illustrating steps in a process. An infographic might be based on a map (see Example 13) or graph, combine multiple charts into one overall visual story (see example 14), or use a specific shape (see Example 15) to convey information.

econlowdown®
click. teach. engage.
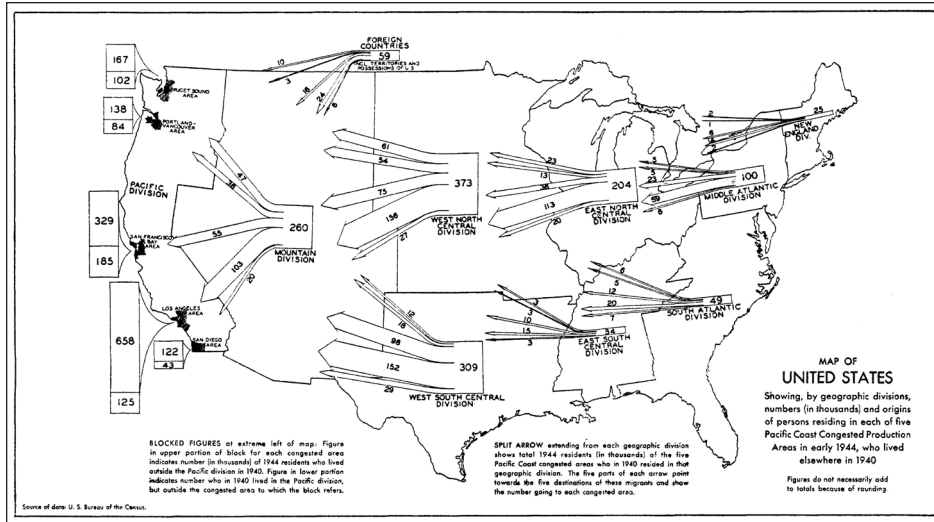
Example 13: Infographic, Map-Based
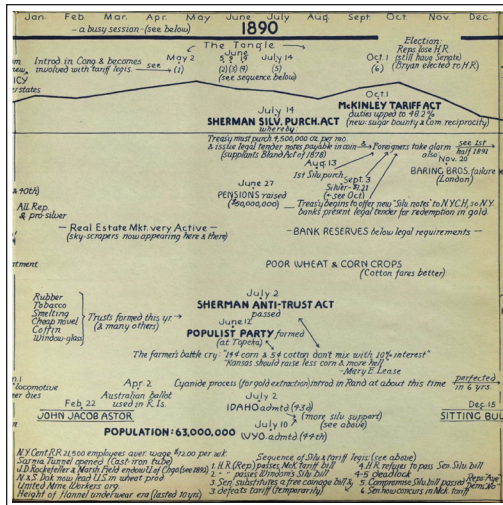
Example 14: Infographic, Timeline
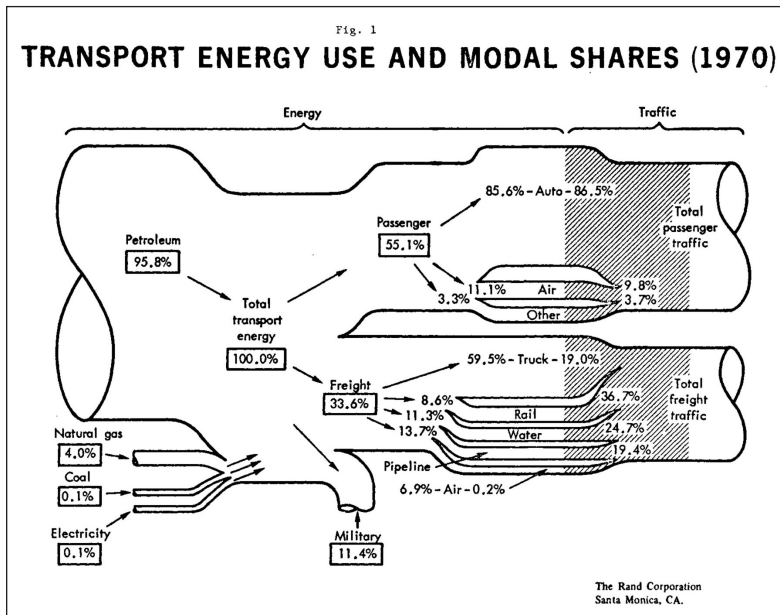
Example 15: Infographic, Shape-Based

Line chart: A graph with the individual data points of a data series connected by line segments (Examples 16 to 18). *Also known as* a line graph.

A line chart is one of the most common types of charts and is used most often to show a given measurement at different points in time. One chart may have multiple lines, representing two or more related measurements, such as the same time in different years (see Example 16) or different datasets connected by subject matter (see Example 17).

A line chart is useful for showing trends. Line charts with many lines (see Example 18) may be useful for comparing datasets but can quickly become unclear as they become visually complex.
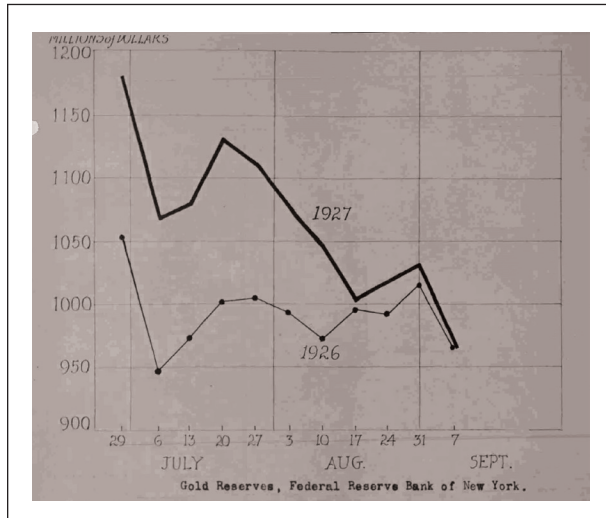
Example 16: Line Chart, Multiple Years
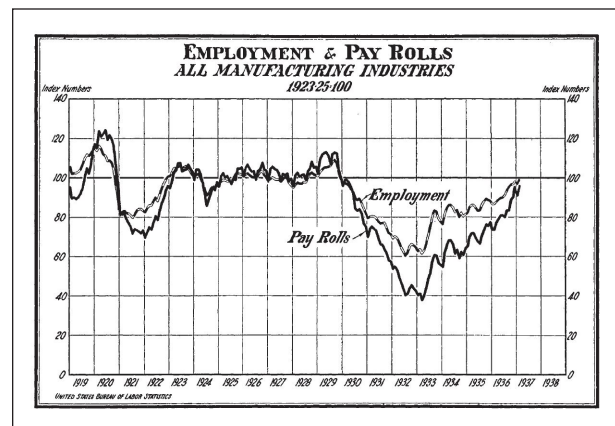
Example 17: Line Chart, Similar Subject Matter
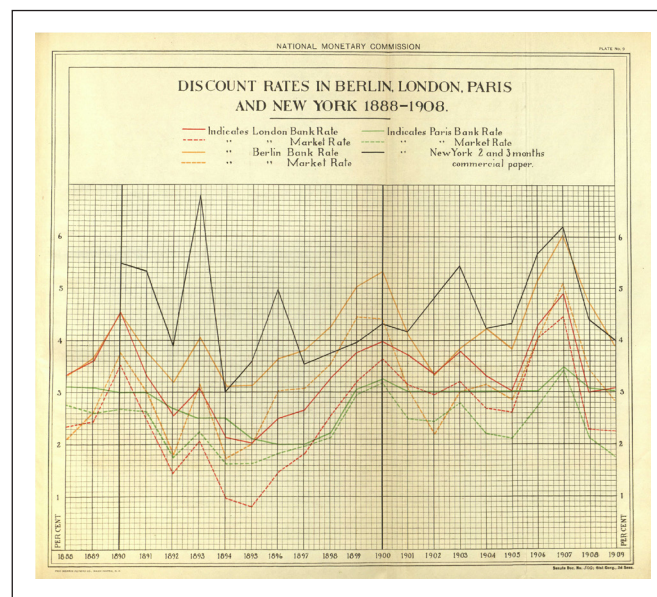
Example 18: Line Chart, Multiple Lines

Map: A graphical depiction of a geographic area, with or without additional information added (Examples 19 to 21). A map with statistical information is called a cartogram; two specific types are **bubble maps** and **choropleth maps**. A city map is sometimes called a plan.

Maps often make or reinforce arguments subtly by labeling or not labeling certain features (such as cities or waterways).

Example 19: Map, Country
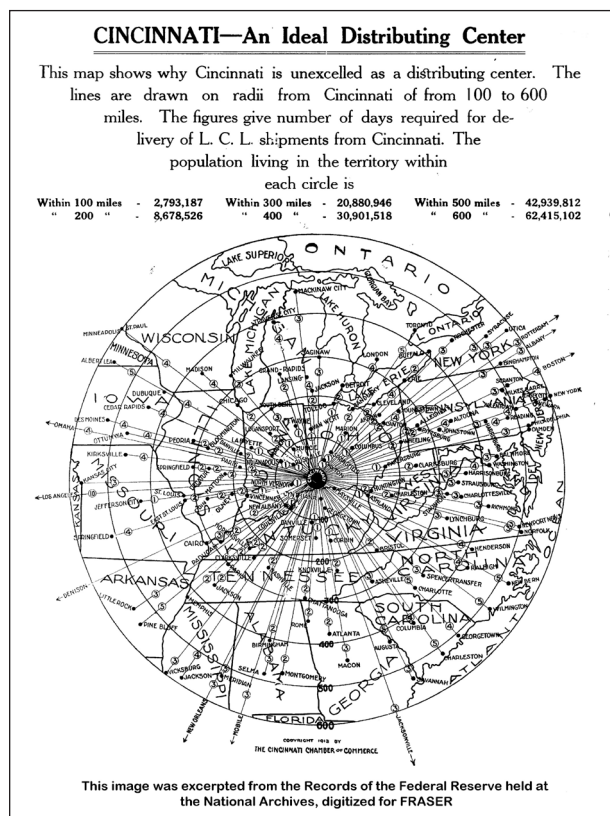
Example 20: Map, Regional
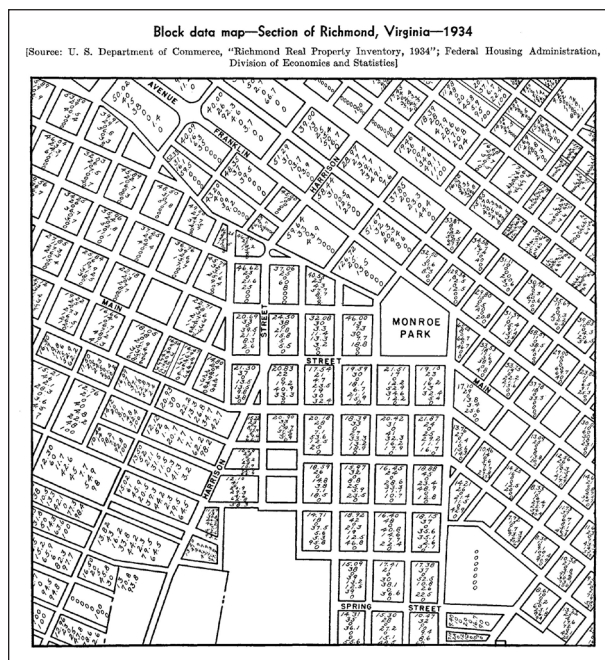
Example 21: Map, City Blocks

NOTE: The following information appears at the bottom of the original map: The figures in each block of this section of a map of Richmond are factors revealing the housing conditions in that block. Listed from top to bottom in each block are (1) average rental of the dwelling units; (2) total number of residential structures; (3) per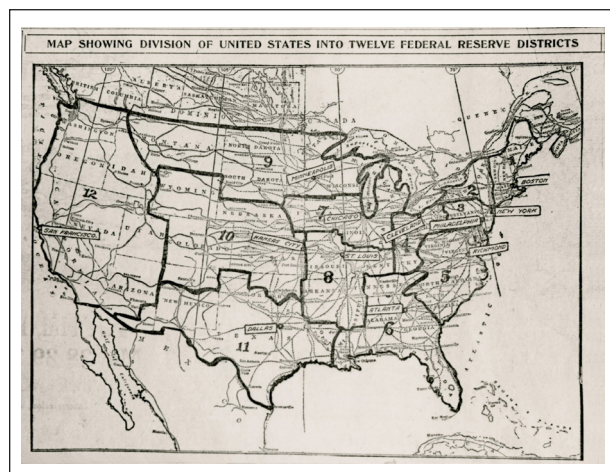centage of total number of residential structures less than 15 years old; (4) percentage of total number of dwelling units that are owner-occupied; (5) percentage of total number of residential structures that need major repairs; (6) percentage of total number of structures used for commercial purposes; (7) percentage of total number of dwelling units that have no private bath; (8) percentage of total number of residents that are nonwhite.

The basic figures for each block are derived from the real property survey for the city. Such a map shows the general pattern of neighborhoods, and helps the mortgage lender to recognize and interpret trends which may change the character of neighborhoods. Dwelling units that are similar in rental, in age, in condition, or similar with respect to other indicators of quality of housing, tend to be concentrated in certain areas. Note how few of the structures in the lowest rental blocks are in good condition, or are owner-occupied. In the better-grade areas, structures are newer, there are more owner-occupants, and dwellings are generally in good condition.

Chart 14-4 **Saving, Investment, and the Current Account Balance**
In the late 1980s, a decline in the investment rate led to a reduction in the current account deficit, while a sharp decline in the national saving rate accounted for the most recent expansion of the deficit.

Percent of GDP

Net national investment

Net national saving

Current account balance

1985 1987 1989 1991 1993 1995 1997 1999 2001 2003

Source: Department of Commerce (Bureau of Economic Analysis).

Example 22: Mixed-Type Chart

Mixed-type chart: A chart that uses more than one type of chart, particularly to show a correlation between multiple sets of data (Example 22).

These charts can be difficult to read and often rely more heavily on the accompanying text to explain the argument being made.

Pie chart: A circular chart divided into segments, each of which is proportional to the value it represents (Examples 23 to 25). Pie charts may have additional color or shading of the various "slices"

Pie charts are often used to represent the composition of a whole. Although it is common to use pie charts to demonstrate the comparative size of various component values, pie charts can be difficult to read accurately when there are more than a handful of slices of the pie (see Example 24).

An exploding pie chart (see Example 25) further visualizes one or more slices of the chart (e.g., by using another pie chart, a **bar chart**, or some other kind of chart). A polar area **diagram** (see Example 26), a kind of pie chart (more popular in the nineteenth century), divides the circle equally and uses the distance of each section from the center of the circle to indicate the section's value (not to be confused with a polar chart, not pictured).

econlowdown®
click. teach. engage.

TOO MANY CHILDREN OF WORKING MOTHERS
LACK GOOD CHILD CARE SERVICES

(CHILD CARE ARRANGEMENTS OF WORKING MOTHERS, FEBRUARY 1965)

Cared for by Mother
28%

Cared for at Home
by Other Than Mother
46%

No Care
8%

Group Care 2%

Cared for
Away From Home
16%

12.3 MILLION CHILDREN UNDER 14 YEARS OF AGE

Example 23: Pie Chart, Few Slices

1. PROPORTION OF SUPPLY OF COTTON FOR 1913 CON-
SUMED IN THE UNITED STATES, HELD IN STOCKS, AND
EXPORTED, WITH DISTRIBUTION OF EXPORTS BY
COUNTRIES TO WHICH EXPORTED

DOMESTIC CONSUMPTION 35.9

UNITED KINGDOM 21.9

GERMANY 14.8

FRANCE 6.3

ITALY 3.1

JAPAN 2.3

SPAIN 1.8

BELGIUM 1.1

ALL OTHER 2.7

STOCKS 9.9

Example 24: Pie Chart, Many Slices

Chart 1–1.   Government Spending as a Share of GDP, 1996

Total Government
Spending in the U.S.
(31%)

Federal Grants to
State and Local
Governments
(3%)

Spending from
State and Local
Revenues
(10%)

Total State
and
Local Spending
(13%)

Spending for Direct
Federal Programs
(18%)

Total Federal
Spending
(21%)

Private
69%

Government
31%

Note: Numbers do not add due to rounding.

Example 25: Exploding Pie Chart

Scale in Millions of Dollars

1907

December   January

November   February

October   March

September   April

August   May

July   June

Gain for New York
Loss "   "   "

Maximum Gain – January $ 13,937,000.
Loss – October $ 40,501,000.

Scale in Millions of Dollars

Example 26: Pie Chart, Polar Area Diagram

Scatterplot: A graph that plots two variables as a single dot on the graph. The location of each dot shows the value for both variables for a single person, place, or thing (Example 27).

The pattern of the scatterplot shows any correlation between two measurements. Most scatterplots also have a line (sometimes known as a "line of best fit") showing the trend of the correlation.

Table: Data presented in rows and columns.

A table is one of the most common kinds of charts and is useful for showing many values at once. Data presented in a table are called tabular data. Organizing data in a table is often a precursor to adapting it into a graph.

Real GDP Growth and Real GDP

Real GDP growth per capita, 2009–2011 (percent)

■ Fourth District MSAs

San Jose, CA♦
♦Portland, OR
♦Austin, TX
McAllen, TX
Bridgeport, CT
San Francisco, CA
Washington, DC
Las Vegas, NV

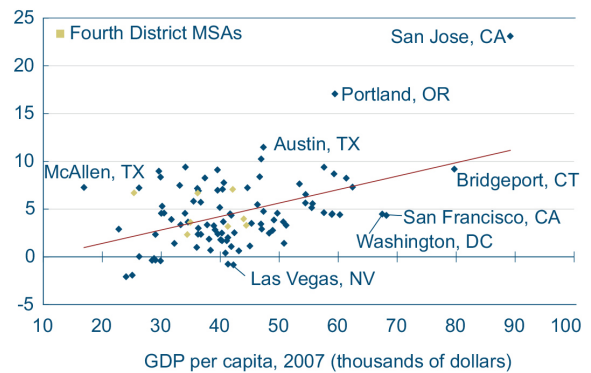GDP per capita, 2007 (thousands of dollars)

Source: Bureau of Economic Analysis; American Community Survey.

Example 27: Scatterplot

INDUSTRIAL POPULATION, BY SEX, JULY, 1914, AND INCREASE IN NUMBER OF FE-
MALE EMPLOYEES, FEMALES ON WORK IN SUBSTITUTION OF MALE WORKERS,
AND NUMBER OF WOMEN DIRECTLY REPLACING MEN, DECEMBER, 1915, AND APRIL,
1916.[1]

Occupational group.	Estimated industrial population, July, 1914.		Increase in females.		Estimated number of females on work in substitution of males.		Number of women directly replacing men.	
	Males.	Females.	December, 1915.	April, 1916.	December, 1915.	April, 1916.	December, 1915.	April, 1916.
Building	967,000	7,000	3,600	6,400	6,100	8,800	700	6,500
Mines and quarries	1,220,000	9,000	800	2,300	2,700	4,400	1,300	3,100
Metal trades	1,642,000	144,000	71,700	126,900	70,300	117,400	16,700	59,200
Chemical trades	160,000	40,000	19,400	33,600	9,600	16,200	7,700	15,600
Textile trades	608,000	851,000	29,700	27,800	57,600	73,400	23,000	35,500
Clothing	286,000	654,000	6,700	11,700	30,400	42,300	13,300	18,800
Food	350,000	170,000	31,700	30,900	29,500	35,000	21,300	32,500
Paper and printing	301,000	169,000	....	[2]900	22,500	23,600	7,300	11,700
Wood	282,000	39,000	7,400	13,200	11,400	17,400	4,600	10,000
Other	444,000	96,000	25,400	35,700	27,000	37,400	13,100	24,500
Total industrial occupations	6,300,000	2,180,000	196,500	287,500	267,100	375,900	109,000	217,400
Commercial	1,057,000	474,500	....	181,000	....	189,000	....	168,000
Professional	174,000	68,500	....	13,000	....	16,000	....	13,000
Banking and finance	179,000	9,500	....	23,000	....	25,000	....	21,000
Public entertainments	181,000	172,000	....	14,000	....	32,000	....	27,000
Transport	1,032,000	9,500	....	16,000	....	18,000	....	17,000
Civil service	231,000	63,000	....	29,000	....	31,000	....	29,000
Arsenals, dockyards, etc	71,000	2,000	....	13,000	....	13,000	....	13,000
Local government (including teachers)	477,000	184,000	....	21,000	....	37,000	....	18,000
Total nonindustrial occupations	3,402,000	983,000	....	310,000	....	361,000	....	306,000
All occupations	9,702,000	3,163,000	....	597,000	....	736,900	....	523,000

[1] The figures in this table are as given in the original report, but in some instances the totals are not the sums of the items given.
[2] Decrease.

Example 28: Table

econlowdown
click. teach. engage.

Sources

Example 1: Area Chart: Westcott, Diane N. and U.S. Bureau of Labor Statistics. "Profile of the Teenage Worker." *Bulletin of the United States Bureau of Labor Statistics*, 1980, No. 2039, p. 10; https://fraser.stlouisfed.org/title/4827?start_page=20

Example 2: Area Chart, Multiple Values: Link, Irene. "Relief and Rehabilitation in the Drought Area." Works Progress Administration Research Bulletin, June 1937, p. 10; https://fraser.stlouisfed.org/title/839?start_page=17.

Example 3: Bar Chart: U.S. Bureau of Labor Statistics. "Women at Work: A Chartbook." *Bulletin of the United States Bureau of Labor Statistics*, April 1983, No. 2168, p. 13; https://fraser.stlouisfed.org/title/290?start_page=21.

Example 4: Stacked Bar Chart: U.S. Bureau of Labor Statistics. "Employment and Economic Status of Older Men and Women." *Bulletin of the United States Bureau of Labor Statistics*, 1952, No. 1092, p. 39; https://fraser.stlouisfed.org/title/4437?start_page=47.

Example 5: Bar Chart, Histogram: Personick, Martin E. "Profiles of Occupational Pay: A Chartbook." *Bulletin of the United States Bureau of Labor Statistics*, 1979, No. 2037, p. 17; https://fraser.stlouisfed.org/title/4828?start_page=25.

Example 6: Bar Chart: Romero, Jessie. "American Made: The Manufacturing Sector Is Stronger Than You Might Think—But New Vulnerabilities Are Emerging." Federal Reserve Bank of Richmond *Econ Focus*, Fourth Quarter 2011, p. 14; https://fraser.stlouisfed.org/title/3941/item/476954?start_page=16.

Example 7: Box Plot: Federal Open Market Committee. "Summary of Economic Projections" (pg. 2) in "Minutes of the Federal Open Market Committee." January 24-25, 2012, p. 18; https://fraser.stlouisfed.org/title/677/item/23306/content/pdf/20120125statement?start_page=18.

Example 8: Box Plot: Min-Max-Average: Personick, Martin E. "Profiles of Occupational Pay: A Chartbook." *Bulletin of the United States Bureau of Labor Statistics*, No. 2037, p. 11; https://fraser.stlouisfed.org/title/4828?start_page=19.

Example 9: Bubble Map: U.S. Reserve Bank Organization Committee. "St. Louis Sales of Drugs, Patent Medicines & Perfumes." 1914. Held in Records of the Federal Reserve System, 1878-1996, Record Group 82 #92, St. Louis, Box 2653, Folder 5; https://fraser.stlouisfed.org/archival/1344/item/469353?start_page=6.

Example 10: Choropleth Maps: Walker, Francis A. *Statistical Atlas of the United States Based on the Results of the Ninth Census 1870*. U.S. Bureau of the Census, 1874, Plate XXXVI; https://fraser.stlouisfed.org/title/64/item/574137?start_page=9.

Example 11: Dot Plot: Federal Open Market Committee. "Summary of Economic Projections" (p. 4) in "Meeting of the Federal Reserve Open Market Committee." January 24-25, 2012, p. 20; https://fraser.stlouisfed.org/title/677/item/23306/content/pdf/fomcminutes20120125?start_page=20.

Example 12: Hub-and-Spoke Chart: U.S. Congress, House Committee on Banking and Currency. "Exhibit 243: Diagram Showing Affiliations of J.P. Morgan & Co., National City Bank, First National Bank, Guaranty Trust Co. and Bankers Trust Co. of New York City with Large Corporations of the United States." February 25, 1913; https://fraser.stlouisfed.org/title/80/item/23678.

Example 13: Infographic, Map-Based: Federal Reserve Bank of San Francisco. "Review of Business Conditions—Twelfth District." *Economic Review*, September 1944, p. 40; https://fraser.stlouisfed.org/title/869/item/33681?start_page=2.

Example 14: Infographic, Timeline: Hostetler, L. Merle. "1890," in *75 Yrs. of American Finance: A Graphic Presentation, 1861 to 1935*. Cleveland Trust Company, 1936; https://fraser.stlouisfed.org/title/162/item/5373?start_page=35 or https://fraser.stlouisfed.org/75years/presentation.php (scrolling presentation).

Example 15: Infographic, Shape-Based: U.S. Congress, Senate Committee on Banking, Housing, and Urban Affairs. "Petroleum Product Shortages." Hearings before the Committee on Banking, Housing, and Urban Affairs, May 7-11, 1973. GPO, 1973, p. 495; https://fraser.stlouisfed.org/title/214?start_page=499.

Example 16: Line Chart, Multiple Years: Strong, Benjamin. "Gold Reserves, Federal Reserve Bank of New York [1926-1927]." N.d. Held in Papers of Benjamin Strong, Correspondence with the Federal Reserve Bank of New York: Other Directors of the Federal Reserve Bank of New York, 1913-1928, Federal Reserve Bank of New York; https://fraser.stlouisfed.org/archival/1160/item/2259?start_page=31.

Example 17: Line Chart, Similar Subject Matter: U.S. Department of Labor and Bureau of Labor Statistics. *Employment and Payrolls*. February 1937, p. 17; https://fraser.stlouisfed.org/title/152/item/5282?start_page=20.

Example 18: Line Chart, Multiple Lines: Andrew, A. Piatt. "Discount Rates in Berlin, London, Paris and New York 1888-1908" in *Financial Diagrams*. Volume XXIII. National Monetary Commission, 1911, Plate No. 9; https://fraser.stlouisfed.org/title/625/item/21503?start_page=15.

Example 19: Map, Country: *St. Louis Republic*. "Map Showing Division of the United States into Twelve Federal Reserve Districts." April 3, 1914, p. 6; https://fraser.stlouisfed.org/timeline/st-louis-fed-centennial#!3.

econlowdown®
click. teach. engage.

Example 20: Map, Region: U.S. Reserve Bank Organization Committee. "Cincinnati—An Ideal Distributing Center." 1914. Held in Records of the Federal Reserve System, 1878-1996, Record Group 82, #4 Vol. 1 Cincinnati , Box 2645, Folder 1; https://fraser.stlouisfed.org/archival/1344/item/469146?start_page=108.

Example 21: Map, City Block: Federal Home Loan Bank System. "Residential Neighborhoods: Their Growth and Structure." Federal Home Loan Bank *Review*, May 1940, 6(8), p. 251; https://fraser.stlouisfed.org/title/116/item/2104?start_page=4.

Example 22: Mixed-Type Chart: Bush, George H.W. and Council of Economic Advisers. "Economic Report of the President." February 2004, p. 261; https://fraser.stlouisfed.org/title/45/item/8103?start_page=266.

Example 23: Pie Chart, Few Slices: U.S. Department of Labor Women's Bureau. "Working Mothers and the Need for Child Care Services." May 1967, p. 23; https://fraser.stlouisfed.org/title/249?start_page=24.

Example 24: Pie Chart, Many Slices: U.S. Bureau of the Census. "Cotton" in *Statistical Atlas of the United States*, July 1914, Plate 468; https://fraser.stlouisfed.org/title/74/item/492438?start_page=14.

Example 25: Exploding Pie Chart: U.S. Office of Management and Budget. *A Citizen's Guide to the Federal Budget: Budget of the United States Government, Fiscal Year 1998*. February 6, 1997, p. 2; https://fraser.stlouisfed.org/title/424/item/7266?start_page=6.

Example 26: Pie Chart, Polar Area Diagram: Andrew, A. Piatt. "New York Clearing House Banks, Monthly Movements of Cash to and from Interior" in *Financial Diagrams*. National Monetary Commission, 1911, Plate No. 19; https://fraser.stlouisfed.org/title/625/item/21503?start_page=25.

Example 27: Scatter Plot: Federal Reserve Bank of Cleveland. "Government Spending and Employment in Recoveries." *Economic Trends*, April 2013 Supplement, p. 7; https://fraser.stlouisfed.org/title/3952/item/529710?start_page=7.

Example 28: Table: Britain Health of Munitions Workers Committee and U.S. Bureau of Labor Statistics. "Employment of Women and Juveniles in Great Britain During the War: Reprints of the Memoranda of the British Health of Munition Workers Committee." *Bulletin of the United States Bureau of Labor Statistics*, No. 223, April 1917, p. 17; https://fraser.stlouisfed.org/title/3860?start_page=17.