

Unemployment Rates by Job

SUBMITTED BY: Nina Hoe, University of Pennsylvania

SUBJECT(S): Computation

GRADE LEVEL(S): 9, 10, 11, 12

≡ OVERVIEW:

In this lesson, students examine unemployment data collected by the Wall Street Journal, across different occupations. Students are asked to answer questions about the data, represent data in multiple ways, describe patterns in the data and discuss the implications of their findings.

≡ RELATED ARTICLES:

- [“The Employment Reality: ‘It’s So Much More Complicated’”](#)
- [“Jeremy Siegel: Why Investors Shouldn’t Panic Over Stock Market Volatility”](#)
- [“A Conversation on Trade and Manufacturing”](#)

Purpose/Objectives: In this lesson, students will compute a) mean, b) median, c) range, and make d) a box plot, e) graph in the 1st quadrant and f) describe data and implications.

WGYP Standards:

Statistics and Probability – Analyze and interpret data using common statistical procedures.

Common Core Standards:

High School – Statistics and Probability

S-ID.1. Represent data with plots on the real number line (dot plots, histograms, and box plots).

S-ID.3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

S-ID.5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

S-ID.6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

Resources/Materials (including one or more Wharton Global Youth Program (WGYP) article):

WGYP Article: [“The Broader Impact of Teen Joblessness”](#)

WGYP Glossary: [Unemployment](#)

WGYP Glossary: [CEO](#)

Activity: Student Worksheet

Have students read the WGYP Article: [“The Employment Reality: ‘It’s So Much More Complicated’”](#) and listen to the WGYP Glossary for [Unemployment](#) and [CEO](#).

The following table is a report done by the [Wall Street Journal Online](#).

Unemployment Rate (%) | Total Employed (in thousands)

Occupation	Category						% Pt Change		% Change		
		2007	2008	2009	2010	'09-'10	2007	2008	2009	2010	'09-'10
Management, professional, and related occupations	Management, professional, and related occupations	2.1	2.7	4.6	4.7	0.1	51,788	52,761	52,219	51,743	-0.9

Occupation	Category	% Pt					% Change				
		2007	2008	2009	2010	'09-'10	2007	2008	2009	2010	'09-'10
Sales and office occupations	Sales and office occupations	4.3	5.3	8.5	9.0	0.5	36,212	35,544	33,787	33,433	-1.0
Professional and related occupations	Management, business, and financial operations	2.1	2.7	4.4	4.5	0.1	30,210	30,702	30,690	30,805	0.4
Service occupations	Service occupations	5.9	6.7	9.6	10.3	0.7	24,137	24,451	24,598	24,634	0.1
Management, business, and financial operations	Management, professional, and related occupations	1.9	2.7	4.9	5.1	0.2	21,577	22,059	21,529	20,938	-2.7
Office and administrative support occupations	Sales and office occupations	4.0	5.1	8.3	8.7	0.4	19,513	19,249	18,146	18,047	-0.5
Production, transportation, and material moving occupations	Production, transportation, and material moving occupations	5.8	7.6	13.3	12.8	-0.5	18,171	17,800	15,951	16,180	1.4
Sales and related occupations	Sales and office occupations	4.8	5.7	8.8	9.4	0.6	16,698	16,295	15,641	15,386	-1.6
Management occupations	Management, business, and financial operations	1.8	2.5	4.6	4.8	0.2	15,486	15,852	15,447	15,001	-2.9
Natural resources, construction, and maintenance occupations	Natural resources, construction, and maintenance occupations	6.3	8.8	15.6	16.1	0.5	15,740	14,806	13,323	13,073	-1.9

Occupation	Category	% Pt					% Change				
		2007	2008	2009	2010	'09-'10	2007	2008	2009	2010	'09-'10
Education, training, and library occupations	Management, business, and financial operations	2.3	2.8	4.1	4.2	0.1	8,485	8,605	8,627	8,628	0.0
Transportation and material moving occupations	Production, transportation, and material moving occupations	6.0	7.6	12.0	12.4	0.4	8,776	8,827	8,297	8,182	-1.4
Production occupations	Production, transportation, and material moving occupations	5.7	7.7	14.7	13.1	-1.6	9,395	8,973	7,654	7,998	4.5
Healthcare practitioner and technical occupations	Management, business, and financial operations	1.3	1.5	2.3	2.5	0.2	7,248	7,399	7,738	7,805	0.9
Food preparation and serving related occupations	Service occupations	7.5	8.7	11.6	12.4	0.8	7,699	7,824	7,733	7,660	-0.9
Construction and extraction occupations	Natural resources, construction, and maintenance occupations	7.6	11.0	19.7	20.1	0.4	9,535	8,667	7,439	7,175	-3.5
Business and financial operations occupations	Management, business, and financial operations	2.4	3.3	5.7	5.6	-0.1	6,091	6,207	6,082	5,937	-2.4
Building and grounds cleaning and maintenance occupations	Service occupations	6.7	7.9	12.1	12.8	0.7	5,469	5,445	5,349	5,328	-0.4

Occupation	Category	% Pt					% Change				
		2007	2008	2009	2010	'09-'10	2007	2008	2009	2010	'09-'10
Personal care and service occupations	Service occupations	4.8	5.7	8.0	8.7	0.7	4,760	4,923	5,043	5,024	-0.4
Installation, maintenance, and repair occupations	Natural resources, construction, and maintenance occupations	3.4	4.5	8.5	9.3	0.8	5,245	5,152	4,957	4,911	-0.9
Computer and mathematical occupations	Management, business, and financial operations	2.1	2.6	5.2	5.2	0	3,441	3,676	3,481	3,531	1.4
Healthcare support occupations	Service occupations	4.5	4.5	6.8	7.6	0.8	3,138	3,212	3,309	3,332	0.7
Protective service occupations	Service occupations	3.7	3.5	5.3	5.9	0.6	3,071	3,047	3,164	3,289	4.0
Retail salespersons	Sales and related occupations	5.5	6.5	11.2	10.9	-0.3	3,492	3,416	3,182	3,286	3.3
First-line supervisors/managers of retail sales workers	Sales and related occupations	2.8	3.2	5.5	6.1	0.6	3,445	3,471	3,311	3,132	-5.4
Cashiers	Sales and related occupations	9.0	10.1	12.5	14.0	1.5	3,022	3,031	3,056	3,109	1.7
Secretaries and administrative assistants	Office and administrative support occupations	2.9	4.1	6.7	7.5	0.8	3,401	3,296	3,176	3,082	-3.0
Driver/sales workers and truck drivers	Transportation and material moving occupations	4.3	5.7	9.7	10.7	1.0	3,460	3,388	3,151	3,028	-3.9
Managers, all other	Management occupations	1.7	2.2	4.1	4.3	0.2	3,398	3,473	3,249	2,898	-10.8

Occupation	Category	% Pt					% Change				
		2007	2008	2009	2010	'09-'10	2007	2008	2009	2010	'09-'10
Registered nurses	Healthcare practitioner and technical occupations	1.0	1.2	2.1	2.1	0	2,629	2,778	2,839	2,843	0.1
Elementary and middle school teachers	Education, training, and library occupations	2.1	2.3	3.9	4.1	0.2	2,943	2,958	2,862	2,813	-1.7
Arts, design, entertainment, sports, and media occupations	Management, business, and financial operations	4.4	5.3	8.4	8.9	0.5	2,789	2,820	2,724	2,759	1.3
Architecture and engineering occupations	Management, business, and financial operations	1.6	3.1	6.9	6.2	-0.7	2,932	2,931	2,740	2,619	-4.4
Community and social services occupations	Management, business, and financial operations	2.3	2.7	4.3	4.6	0.3	2,265	2,293	2,341	2,337	-0.2
Janitors and building cleaners	Building and grounds cleaning and maintenance occupations	6.1	6.8	10.7	10.4	-0.3	2,080	2,125	2,149	2,186	1.7
Waiters and waitresses	Food preparation and serving related occupations	7.2	8.5	11.1	11.7	0.6	1,978	2,010	2,005	2,067	3.1
Cooks	Food preparation and serving related occupations	7.8	9.2	12.7	13.5	0.8	1,939	1,997	2,004	1,951	-2.6

Occupation	Category	% Pt					% Change				
		2007	2008	2009	2010	'09-'10	2007	2008	2009	2010	'09-'10
Nursing, psychiatric, and home health aides	Healthcare support occupations	5.2	5.2	7.4	9.2	1.8	1,879	1,889	2,002	1,928	-3.7
Customer service representatives	Office and administrative support occupations	4.9	7.1	10.6	9.2	-1.4	1,917	1,908	1,862	1,896	1.8
Legal occupations	Management, business, and financial operations	2.3	2.6	3.4	2.7	-0.7	1,668	1,671	1,710	1,716	0.4
Laborers and freight, stock, and material movers, hand	Transportation and material moving occupations	9.4	10.8	17.3	16.6	-0.7	1,877	1,889	1,707	1,700	-0.4
Accountants and auditors	Business and financial operations occupations	2.0	2.5	5.0	5.0	0	1,806	1,762	1,754	1,646	-6.2
First-line supervisors/managers of office and administrative support workers	Office and administrative support occupations	1.9	2.6	5.4	6.2	0.8	1,629	1,641	1,632	1,507	-7.7
Chief executives	Management occupations	1.3	1.5	2.8	2.8	0	1,649	1,655	1,631	1,505	-7.7
Stock clerks and order fillers	Office and administrative support occupations	6.9	8.9	13.4	12.3	-1.1	1,512	1,481	1,397	1,456	4.2
Life, physical, and social science occupations	Management, business, and financial operations	2.0	2.4	4.5	4.6	0.1	1,382	1,307	1,328	1,409	6.1

Occupation	Category	% Pt					% Change				
		2007	2008	2009	2010	'09-'10	2007	2008	2009	2010	'09-'10
Maids and housekeeping cleaners	Building and grounds cleaning and maintenance occupations	6.7	7.6	11.3	12.0	0.7	1,427	1,434	1,428	1,407	-1.5
Postsecondary teachers	Education, training, and library occupations	2.5	2.8	3.2	3.1	-0.1	1,261	1,218	1,321	1,300	-1.6
Bookkeeping, accounting, and auditing clerks	Office and administrative support occupations	2.1	3.2	6.3	5.4	-0.9	1,490	1,434	1,306	1,297	-0.7
Sales representatives, wholesale and manufacturing	Sales and related occupations	2.0	3.1	6.3	6.3	0	1,442	1,343	1,317	1,284	-2.5

Class Discussion: (5 mins)

1. Why is it relevant to look at unemployment data by occupation?
2. As you select and plan for careers, what information is important to keep in mind?
(Encourage students to think about happiness, education required and salary in addition to employability/demand.)

Spend some time looking at these data. Have students write down or mark-up anything that stands out. Ask students to describe what information is being represented in this table. Have students work in groups.

Helpful Hints:

- ***Begin with questions 1 – 5 as a whole class.***
 - ***(6 – 9 can be skipped if time is short.)***
- Break students into small groups to complete 10 and 11.***

- **Discuss 12 as a whole group.**

Have students complete 13 – 15 individually or in small groups. Ask them to explain their choices about their selections.

Student Activity: (25 mins)

1. In 2010, which occupation had: (provide occupation name and rate)

a. the lowest unemployment rate?

(Registered nurses – 2.1%)

b. the highest unemployment rate?

(Construction and extraction occupations – 20.1%)

2. In 2010, which occupation had: (provide occupation name and number)

a. the least number of people employed?

(Sales representatives, wholesale and manufacturing – 1,284,000)

b. the most number of people employed?

(Management, professional, and related occupations – 51,743,000)

3. How is this data organized? Why did the creators/aggregators of this data choose this order?

(By 2010 Total Employed)

4. Which occupation experienced: (state the occupation and the percentage change – don't forget to indicate the +/- direction of the change)

a. the largest percentage change from 2009 to 2010 in unemployment?

(Nursing, psychiatric, and home health aids – +1.8%)

b. the smallest percentage change from 2009 to 2010 in unemployment?

(Sales reps, computer and math occupations, accountants and auditors, CEOs, RNs – 0%)

5. Looking at the patterns observed in all of these data, which categories of occupations seem to have: (provide occupation name and rate) **(All mixed!!)**

a. the highest rate of unemployment?

(natural resources construction)

b. the lowest rate of unemployment?

(Healthcare, MGMT business and financial operations, Education training and library)

6. According to this data, there were 376,201,000 people in the work force in 2010. What percentage of people worked in:

a. Service occupations?

(8.9 %)

b. Computer and mathematical occupations?

(0.9%)

c. Legal Operations?

(0.3%)

7. What is the **range** in the total number of people employed by occupation?

(51,743,000 – 1,284,000 = 50,459,000)

8. What is the **median** in the total number of people employed by occupation?

(3,120,000)

9. Estimate the 25th and 75th percentiles and the interquartile range. Explain what these divisions mean.

(75th = 7,998,000; 25th = 1,928,000)

(divide students into groups to complete 10 and 11)

10. Using a highlighter, mark all of the occupations that fall into the “Management, business, and financial occupations” category (10). Produce a box plot of the unemployment rates in 2010 (leave room for one other box plot next to this).

a. After making a sketch of the plot, write the 5-number summary at the appropriate places).

11. Using a highlighter, mark all of the occupations that fall into the “Service occupations” category (5). Produce a box plot of the unemployment rates in 2010 next to the box plot you produced in #9.

12. In a few sentences, describe the similarities and differences you observe.

13. Select 4 occupations in which you are most interested. On the axes below, produce line plots of each of these four occupations by unemployment rate percentages across the four years. Let the x-axis represent the given years and the y-axis represent unemployment rates.

2007	2008	2009	2010	2011

14. Describe the unemployment rates in these occupations individually and relative to one another over this four-year period.

15. Use these graphs to predict the unemployment rates for 2011.

Tying It All Together: (10 mins)

1. Given your description and answers to the last few questions as well as question 9, which occupation(s) do you think you will enter into?
2. How does looking at this data affect your ideas about what to study in college?
3. What other factors will you consider in choosing a career?

What Worked and What I Would Do Differently: