Keeping Up with the Joneses

6695

Introduction

This activity explores what happens to measures of center and spread when outliers are introduced and when sample size varies.

Grades 6-8

NCTM Data Analysis and Probability Standards

- Develop and evaluate inferences and predictions that are based on data
- Use observations about differences between two or more samples to make conjectures about the populations from which the samples were taken
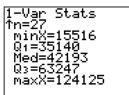
Files/Materials Needed

salaryneighborhood.73l, salarytown.73l

PART 1 WHAT IS AVERAGE?

1

a. Launch TI-Navigator™ on the computer and start the session.
b. Have each student log into NavNet on their calculator.

2

a. *Force send* the list **salaryneighborhood.73l** to the entire class. The file has the median salaries of 27 different professions from 1999. Use it to simulate a neighborhood of 27 people. Share the corresponding occupations with the class. They are listed in the chart at the end of this activity.
b. Have students exit NavNet.
c. Define range, mean, median, and quartiles and tell students to use the **1-Var Stats** function to find each statistic. (The list name is **S27**. To access, press [2nd][STAT], highlight the list called **S27**, and press [ENTER].)

```
1-Var Stats
x̄=50326.22222
Σx=1358808
Σx²=8.69537ε10
Sx=26725.0846
↓σx=26225.50625
 n=27
```

```
1-Var Stats
↑n=27
 minX=15516
 Q₁=35140
 Med=42193
 Q₃=63247
 maxX=124125
```

d. Ask questions such as:
  - *What is the median income? What does that mean?*
  - *What job is in the upper quartile?*
  - *Do you think this is a typical neighborhood? Why or why not?*

PART 2 INVESTIGATING OUTLIERS

3

a. Tell students to suppose that the bartender, making $18,844, suddenly received his dream contract with the Dallas Mavericks and had a first year salary of $1.1 million dollars. Ask what they think will happen to each statistic.
b. Divide the class (and the data) into four groups. Tell each student to replace one of the salaries in the quadrant they were assigned with a $1.1 million dollar salary. Take screen captures of the results from at least one person in each group to analyze which statistics change as each salary changes.

PART 3 INVESTIGATING SAMPLE SIZE

4

a. *Force Send* the list **salarytown.73l** to the students. Tell students that this data represents the salaries of all the members of a town that also contains the neighborhood data from Part I.
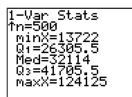
Keeping Up with the Joneses

b. Have students find the range, mean, median, and quartiles as they did in Step 2c. (The list name is **S500**.)

```
1-Var Stats
 x̄=35565.422
 Σx=17782711
 Σx²=7.28263ᴇ11
 Sx=13856.80075
↓σx=13842.93701
 n=500
```

```
1-Var Stats
↑n=500
 minX=13722
 Q₁=26305.5
 Med=32114
 Q₃=41705.5
 maxX=124125
```

Talk about the neighborhood in relation to the town. Was it a poor or rich neighborhood? Did the neighborhood reflect what the town was like?

5

a. Instruct students to change one salary to $1.1 million as they did in Part 2.

b. Talk about what changed and what didn't change. Include:
  • *How much did the average change?*
  • *Did the average change as much as it did in the neighborhood sample? Explain.*

EXTENSION

6

Have students create box-and-whisker plots to analyze the changes in center and spread discussed in this activity.

Occupation	Salary
Financial Manager	$50,458
Funeral Director	$41,800
Engineering Manager	$80,943
Electrical Engineer	$63,247
Actuary	$72,449
Surveying and Mapping Technician	$36,583
Lawyer	$80,137
Podiatrist	$83,111
Doctor	$124,125
Restaurant Hostess	$16,506
Bartender	$18,844
Cashier	$17,048
Mail Person	$39,642
Electrician	$37,757
Automotive Body and Repair	$30,754
Dentist	$102,843
Psychologist	$50,984
Computer Programmer	$54,858
Architect	$51,081
Librarian	$36,866
Police Officer	$42,193
Trucker	$35,275
Machinist	$35,140
Furniture Maker	$26,586
Airplane Pilot	$62,415
Elevator Installer	$51,647
Maid	$15,516