IS THERE A RELATIONSHIP BETWEEN EDUCATION AND INCOME

Correlation Essential Question:
How do we show, describe and measure the relationship between two variables?

Correlation Driving Questions:
Is there a relationship between how educated people are and how much wealth is in their community?

ACCESSING PRIOR KNOWLEDGE:

1) What is the American Dream? Write a 2-3 sentence explanation.

2) What are factors of the American Dream?
   Hint: Obama talked about Education as one of the factors that influence the American Dream and Personal Wealth as one of the outcomes of the American Dream.

REMEMBERING OUR WORK WITH CORRELATION:

Circle Correct Answer:

A) Positive Correlation  A) Positive Correlation  A) Positive Correlation
B) Negative Correlation  B) Negative Correlation  B) Negative Correlation
C) No Correlation        C) No Correlation        C) No Correlation
The below data from May 2007 is from the *Center for Community Research and Solutions* [www.unitedwayla.org](http://www.unitedwayla.org) and is based upon Service Planning Areas (SPA) within the county of Los Angeles which is organized into the following 8 geographic areas:

<table>
<thead>
<tr>
<th>SPA 1 Antelope Valley</th>
<th>SPA 5 West</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPA 2 San Fernando Valley</td>
<td>SPA 6 South</td>
</tr>
<tr>
<td>SPA 3 San Gabriel Valley</td>
<td>SPA 7 East</td>
</tr>
<tr>
<td><strong>SPA 4 Metro (Camino Nuevo HS)</strong></td>
<td>SPA 8 South Bay</td>
</tr>
</tbody>
</table>

BEFORE WE BEGIN IT WILL BE IMPORTANT TO DISTINGUISH BETWEEN **CORRELATION** AND **CAUSATION**.

**Definitions from** [www.wikipedia.com](http://www.wikipedia.com)

**Correlation:** indicates the strength and direction of a *linear* relationship between two random variables.

For this lab we are going to look at the strength and direction of the linear relationship between the two random variables of *education* and *income*.

**Causation:** "Correlation does not imply causation" is a phrase used in science and statistics to emphasize that *correlation* between two variables does not automatically imply that one causes the other (though it doesn't remove the fact that correlation can still be a hint, whether powerful or otherwise).

For this lab we are going to establish if there is a relationship between one’s education and one’s household income.

**Thinking about the difference** (answer the questions below)

1) How are correlation and causation different from each other?

2) If our lab shows a relationship between *education* and *income* why is it that we cannot automatically say an education will cause you to have more money? What other factors / variables influence a person’s income beyond an education? Identify at least three factors that influence a person’s income beyond an education and explain how each factor affects a person’s possible income.
### COUNTY CORRELATION:

#### MEDIAN HOUSEHOLD INCOME FOR FAMILIES LIVING IN DESIGNATED REGION

<table>
<thead>
<tr>
<th>INCOME</th>
<th>SPA 1</th>
<th>SPA 2</th>
<th>SPA 3</th>
<th>SPA 4</th>
<th>SPA 5</th>
<th>SPA 6</th>
<th>SPA 7</th>
<th>SPA 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Average home income</td>
<td>$49,104</td>
<td>$58,238</td>
<td>$54,388</td>
<td>$32,715</td>
<td>$84,696</td>
<td>$29,676</td>
<td>$46,357</td>
<td>$54,610</td>
</tr>
</tbody>
</table>

### PERCENTAGE OF INDIVIDUALS LIVING IN EACH REGION WITH A COLLEGE DEGREE

<table>
<thead>
<tr>
<th>INCOME</th>
<th>SPA 1</th>
<th>SPA 2</th>
<th>SPA 3</th>
<th>SPA 4</th>
<th>SPA 5</th>
<th>SPA 6</th>
<th>SPA 7</th>
<th>SPA 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. or greater</td>
<td>19.4%</td>
<td>28.4%</td>
<td>25.8%</td>
<td>23.9%</td>
<td>52%</td>
<td>7.7%</td>
<td>13.2%</td>
<td>27%</td>
</tr>
</tbody>
</table>

### THINKING ABOUT THE ABOVE DATA TABLES:

**DIRECTIONS:** ANSWER THE FOLLOWING QUESTIONS

1) **Choose any two of the SPA regions above to look at more closely.**

   The two SPA regions I am looking at are
   
   A) SPA ____, the region of __________________________ which has an average home income of __________________________ with _______ percent of individuals with a college degree.
   
   B) SPA ____, the region of __________________________ which has an average home income of __________________________ with _______ percent of individuals with a college degree.

2) **What are three things you know about each of the above regions you have chosen.**

   A) SPA ____ the region of ________________  
      •  
      •  
      •  

   B) SPA ____ the region of ________________  
      •  
      •  
      •  

Find a classmate who chose the same SPA regions and what three things did they know about the area?

   •  
   •  
   •  

   •  
   •  
   •  

**PART 1: Identifying Variables:**

**In our situation:** (circle the correct underlined statement)

Does the education depend upon the income or does the income depend upon the education?

How does your above answer relate to which variable *(education or income)* will be used for which axis *(x or y)*?

______________________________________________________________________________

Independent variable (x): __________________  Dependent variable (y): _________________

**PART 2: Labeling Axis and Determining Scale:**

**In our situation:**

The range for the x-axis is: (smallest #) ________ to (biggest #) ________ : scale: ____________

**In our situation:**

The range for the y-axis is: (smallest #) ________ to (biggest #) ________ : scale: ____________

**Graph Title: Is there a relationship between education and income?**

**POINTS OF DATA**

What are your ordered pairs?

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<th>SPA 1</th>
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<th>SPA 8</th>
</tr>
</thead>
</table>

X-Axis Title: ____________________________
1) What type of correlation does your scatter plot show?  check one

_____ negative correlation  _____ no correlation  _____ positive correlation

Explain your answer:

2) Think back to your answer for the question about what other factors / variables influence a person’s income beyond an education. Choose one of the factors you identified and describe how you think that particular factor would impact the graph you just made.

3) What is the equation of your best fit line? Write your equation in y = mx + b form.

   **STEP 1: FIND YOUR SLOPE**

   **STEP 2: FIND YOUR Y-INTERCEPT**

   WHAT IS YOUR EQUATION:

4) As the amount of individual education increases what happens the amount of community wealth?

   Circle the appropriate answer:  decreases  can’t tell  increases

5) State in your own words a relationship that may exists between individual income and community wealth.

6) What may be possible limitations to our research?