Graphing Data

for Science

Graphing Data

- A graph is a visual representation of data that allows us to quickly see trends and relationships between (or among) variables.

- On graphs we will plot the responding variable and the manipulated variable from a data set.

- Most of the graphs we construct will be scatterplots.

Experimental Variables

- **Manipulated (Independent) Variable** – the one being changed, or decided on, in the experiment.

- **Responding (Dependent) Variable** – will change as a result of the other variable changing.

- **Controlled Variable** – does not change *(or is not changed)* in the experiment.

Constructing a Scatterplot

1. Write the title at the top (*y* versus *x* and something descriptive)

    – *x* is manipulated and *y* is responding.

2. Label the axis with units.

3. Choose an appropriate scale.

    – Approximately 1/2 to 2/3 of the space

4. Plot your data points.

5. Draw a line or curve of best fit (trendline).

    – *Don't "connect the dots"*

Constructing a Scatterplot

- If the data to be graphed on an axis are clustered together but far from zero, you may begin the scale on the axis at a value other than zero.

Constructing a Scatterplot

Figure 1. Car ownership in Anytowne, by household income
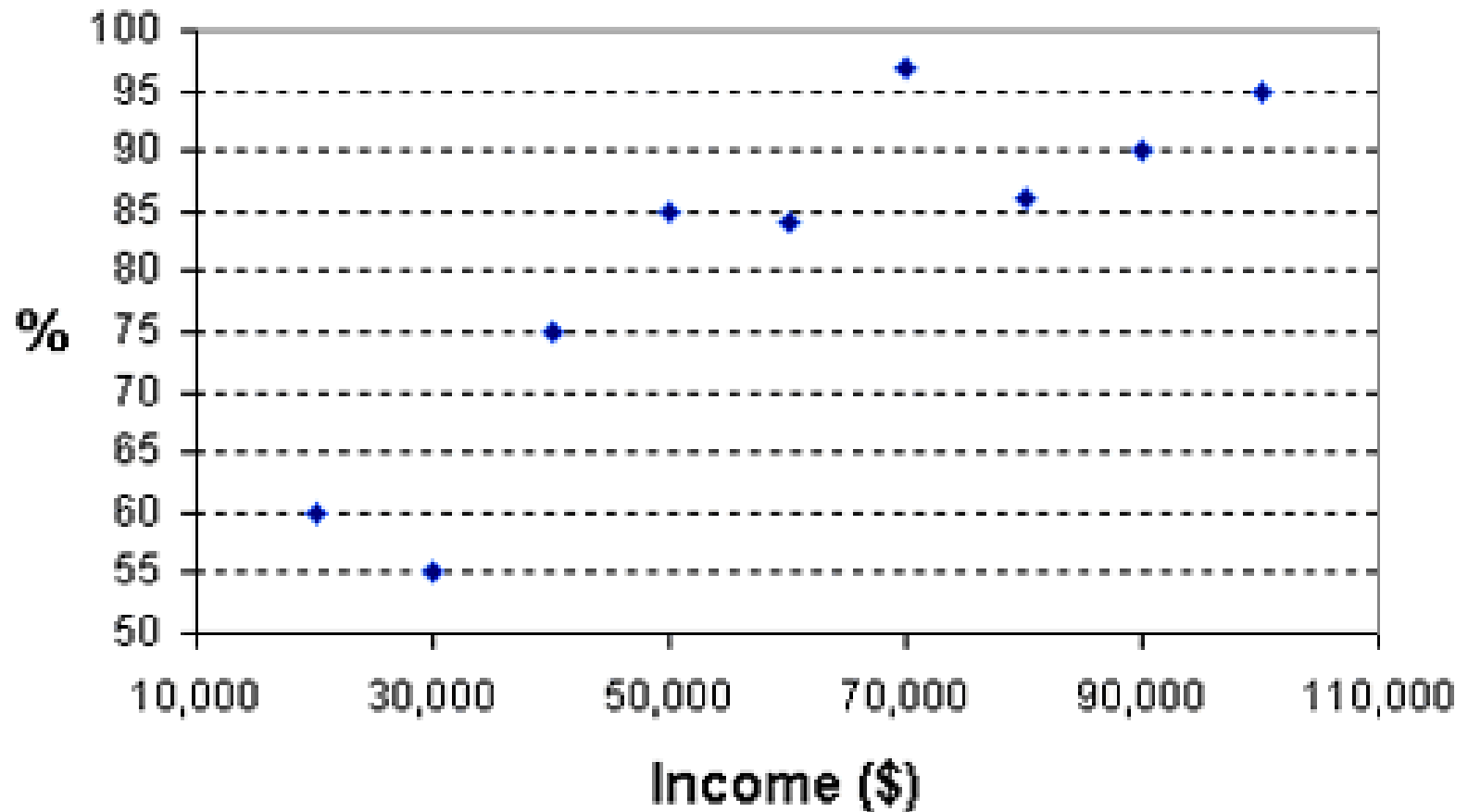
Other Definitions

Correlation – the relationship that exists between the variables.

Interpolate – to determine values within your data set on the trendline.

Extrapolate – to determine values beyond your data set by extending the trendline.

– extrapolations have a higher uncertainty than interpolations

A Bad Example of Extrapolating

When Elvis Presley died in 1977, there were an estimated 37 Elvis impersonators in the world.

By 1993, there were 48,000 Elvis impersonators, an exponential increase.

Extrapolating from this, by 2010 there will be 2.5 billion Elvis impersonators. The population of the world will be about 7.5 billion by 2010.

Thus every 3rd person in the world will be an Elvis impersonator.

– Caen, H., San Francisco Chronicle; October 27, 1993