Name: _____ Hour: _____

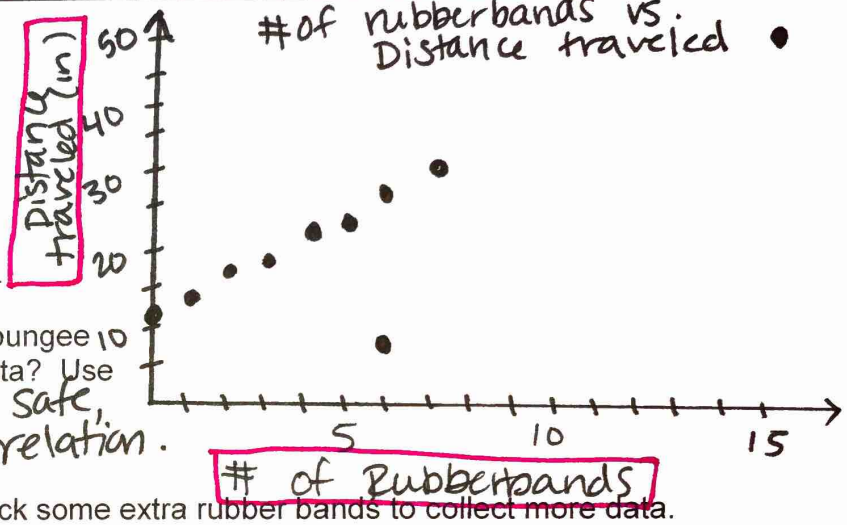
Barbie™ Lesson 3.1: Day 2: How safe is Barbie?

How can we sure that the bungee cord we make Barbie will keep her safe? Should you be worried if you used the wrong units, chose the wrong axes, or measured wrong?

Below is the data for one group's Barbie bungee.

Number of rubber bands	0	1	2	3	4	5	6	7
Distance traveled (in)	12	14	17	18	22	23	26	30

1. Go to stapplet.com and create a scatterplot. Sketch it to the right. (Leave extra room on the right.)



2. Find the correlation. $r =$ .992

3. How safe do you feel Barbie's bungee jump would be if we use this data? Use the correlation to justify. Very safe, that is a strong correlation.

Interpret as: Strong, positive, linear pattern

4. One of the group members snuck some extra rubber bands to collect more data. Add the point (15 rubberbands, 49 in) to your scatterplot. How do you think this outlier will affect the correlation? Verify in the applet. What is the new r?

Outliers in pattern strengthen r.

It will make it stronger because it follows the line. $r =$

5. One group member accidently left off a digit. Add the point (6 rubberbands, 6 in) to the scatterplot. How do you think this outlier will affect the correlation? Verify in the applet. What is the new r?

Outliers outside pattern weaken r.

It will make it weaker because it's out of the line. $r =$

Unfortunately, the group had measured the lowest point of Barbie's head in inches instead of centimeters. To fix this they multiplied the inches by 2.54 (1 in. = 2.54 cm). The new data is below.

Number of rubber bands	0	1	2	3	4	5	6	7
Distance traveled (cm)	30.48	35.56	43.18	45.72	55.88	58.42	67.04	76.20

6. How do you think these changes will affect the correlation? Verify by calculating the correlation in the applet.

Changing units doesn't change r.

It won't change because the points don't move away from each other. $r = .992$

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Lesson 3.1 – Displaying Relationships: Correlation

Big Ideas:

LT#1 Interpret r
Direction (+/-)
Form – Always linear!
Strength
-1 -.5 0 .5 1
strong moderate weak moderate strong

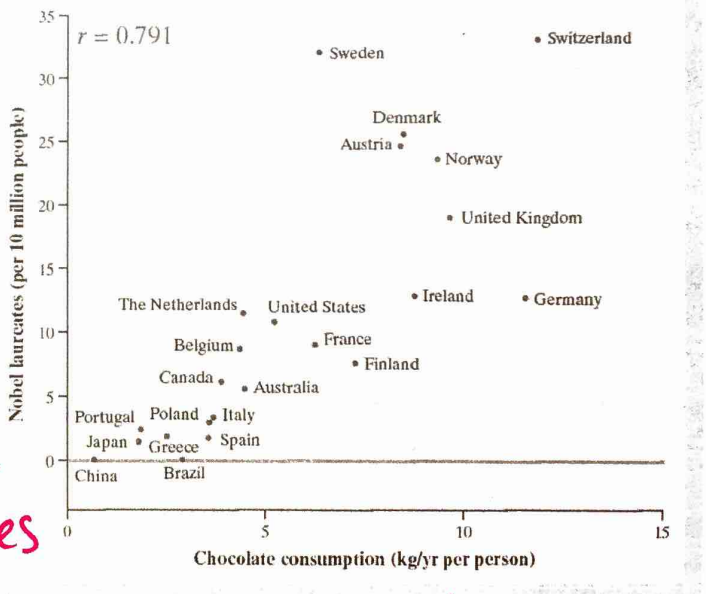
LT#2 Correlation
-r doesn't have units
-Switching axes doesn't change r
-Nonresistant
→ outliers in pattern strengthen
→ outliers out of pattern weaken

LT#3
Correlation does NOT equal Causation.

*Use -ly words for in between.

Check Your Understanding:

Most people love chocolate for its great taste. But does it also make you smarter? A scatterplot like this one recently appeared in the New England Journal of Medicine. The explanatory variable is the chocolate consumption per person for a sample of countries. The response variable is the number of Nobel Prizes per 10 million residents of that country.



1. Interpret the correlation of $r = 0.791$.

There is a moderately strong positive linear relationship between choc. consumption & Nobel winners.

2. If people in the United States started eating more chocolate, can we expect more Nobel prizes to be awarded to residents of the United States? Explain.

No, correlation does not mean one variable causes change in the other. There is probably something else impacting both variables, like the economy in the countries.

3. What effect does Switzerland have on the correlation? Explain.

It strengthens the correlation since it follows the linear pattern.