Algebra 1: Unit 6, lesson 7: Scatterplot Activity/Notes

African Footprints (by Patrick Hopfensperger, University of Wisconsin-Milwaukee)

There is a place in Tanzania, Africa, known as Laetoli. It is a special place because it is where scientists believe our ancestors of long ago walked side-by-side. It is where scientists have worked to get an understanding of the past. In the late 1970s, two sets of footprints were discovered at Laetoli. There were 70 footprints in two side-by-side lines thirty meters long, preserved in volcanic ash. Apparently a volcano exploded sending ash everywhere and the two individuals just happened to walk through the area, preserving their footprints. Fossil remains in the area tell scientists that the ancestors who left the footprints found at Laetoli lived about three and a half million years ago.

Using plaster casts, anthropologists made copies of the footprints. The locations of the footprints were put on a map, so that the length of the stride can also be determined. Based on these observations, foot lengths for the two ancestors are given; these are averages based on the 70 observed footprints. Ancestor 1 length of footprint: 21.5 cm. Ancestor 2 length of footprint: 18.5 cm

Based on these dimensions, how tall were these ancestors at Laetoli?

- To determine if there's a correlation between foot length and height, we can make a picture of the two variables, called a SCATTERPLOT.

Student	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Length (cm) INCH																												
Height (cm) INCH																												

(did in class)

a. Before you make the scatterplot, what kind of trend do you see?

THE TALLER PEOPLE TEND TO HAVE LONGER FEET

b. Identify the independent variable: FOOT LENGTH, SINCE IT IS BEING USED TO PREDICT HEIGHT

c. Identify the dependent variable: HEIGHT, SINCE IT'S THE VARIABLE BEING PREDICTED

d. Now make the scatterplot (label axes please).

Identify the slope, y-intercept, and write the equation that fits it.

$y = mx + b$

$y = 2.07x + 46.3$

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slope: $\frac{2.07}{1}$ (height / foot)

intercept: $(0, 46.3)$

f. Interpret in the context, the meaning of the slope and y-intercept.

FOR EVERY 1 INCH INCREASE IN FOOT LENGTH, THE HEIGHT SHOULD INCREASE BY ABOUT 2".

IF SOMEONE HAS A FOOT LENGTH OF ZERO, THEIR PREDICTED HEIGHT SHOULD BE 46.3".

g. Use your equation for the line of best fit to predict the height of the first ancestor. $x = 8.46"$

$y = 2.07(8.46) + 46.3$ pred. $\sim 63.8"$

h. Use your equation for the line of best fit to predict the height of the second ancestor. $x = 7.28"$

$y = 2.07(7.28) + 46.3$ pred $\sim 61.4"$

i. How accurate do you think your prediction is? Why?

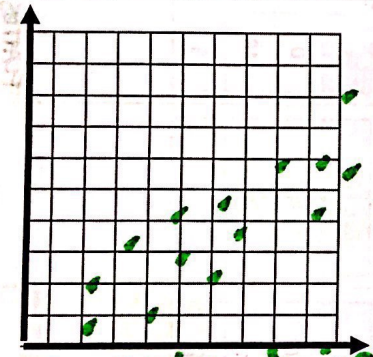
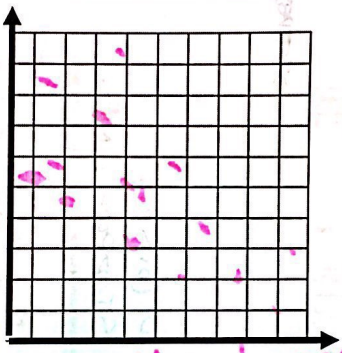
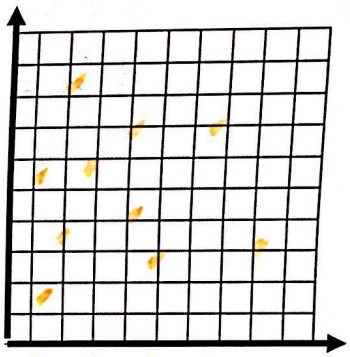
- **A scatterplot** DATA DISPLAY WHICH SHOWS THE RELATIONSHIP (if any) BETWEEN 2 VARIABLES

What pattern could two plotted variables look like when plotted?

positive ↑ slope

Trend has negative slope ↑

Correlation

Positive Correlation	Negative Correlation	No Correlation
		
as x gets bigger, so does y	as x gets bigger, y values get smaller	no line, no slope

Line of best fit:

- line that is plotted on a scatterplot that fits the data best

The purpose of plotting a line of best fit

To HAVE AN EQUATION SO THAT WE CAN MAKE PREDICTIONS: Substitute in x, solve for y

To find the equation of a line of best

- SKETCH A LINE THAT FITS DATA BEST (in your opinion)
- FIND TWO POINTS (COORDINATES) ON GRAPH THAT THE LINE GOES THROUGH: THESE POINTS DO NOT HAVE TO BE DATA POINTS
- USE SLOPE FORMULA TO CALCULATE SLOPE BETWEEN THE 2 POINTS: $m = \frac{y_2 - y}{x_2 - x_1}$
- USE POINT-SLOPE FORMULA TO SUBSTITUTE SLOPE & USE ONE OF ORDERED PAIRS: $y - y_1 = m(x - x_1)$
- USE EQUATION TO MAKE A PREDICTION FOR ANY X, IF YOU NEED TO!