Learning Goal: Use a scatterplot to display and describe the relationship between two quantitative variables.

Specific Learning Objectives:
- Identify explanatory and response variables;
- Read and interpret scatterplots;
- Identify direction, strength and form in scatterplots.

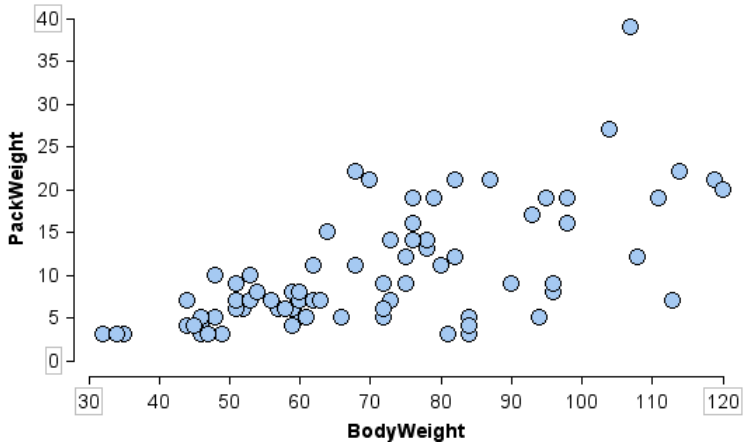
Introduction:

Previously we looked at data that comes from taking one quantitative measurement for each individual in a group. Now we will take two quantitative measurements for each individual and look at how the two measurements relate to each other. We will use a scatterplot to graph both measurements for each individual.

Here is a partial spreadsheet of body weights (in pounds) and backpack weights (in pounds) for a sample of elementary school students. The scatterplot contains data for all 79 students in the data set.

Backpack

	Name	BodyWeight	PackWeight
1	Angie	45	4
2	Emma	46	4
3	Sadie	32	3
4	Maddyn	47	3
5	Lorien	60	7
6	Bailey	52	6
7	Micah	57	6
8	Kilie	48	10
9	Abigail	46	3
10	Eugene	34	3



1) Do students who weigh more tend to carry more weight in their backpacks? Why do you think so?

Response variable: This is the variable that measures the outcome of a study. The response variable is also known as the dependent variable. It goes on the vertical axis in the scatterplot.

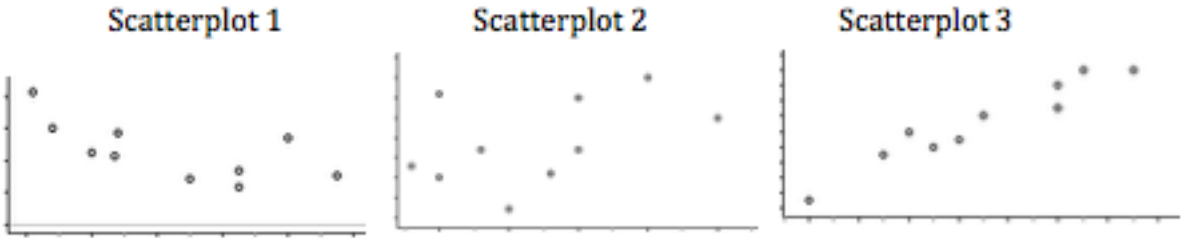
Explanatory variable: The explanatory variable may explain or contribute to the response variable; for this reason, we often use it to predict the values of the response variable. The explanatory variable is also known as the independent variable. It goes on the horizontal axis in the scatterplot.

2) Identify which variable goes on the horizontal axis in the scatterplot.

   a) For a group of students, a teacher compares homework grades to exam grades.

   b) For people at a bar, a researcher measures blood alcohol content (BAC) and the number of alcoholic drinks consumed.

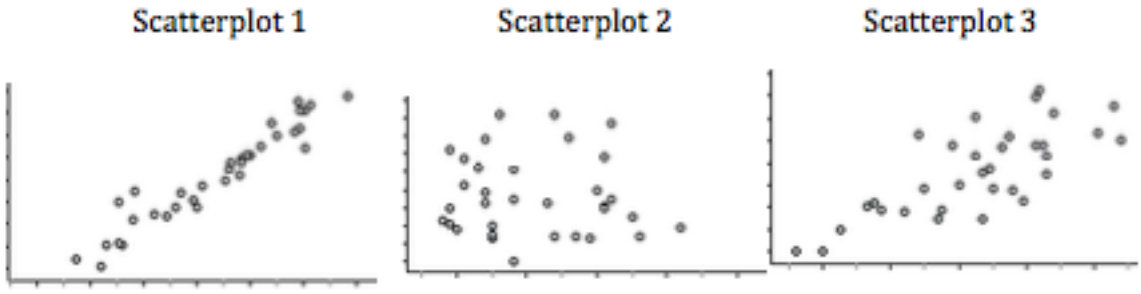
3) The scatterplots below differ in the DIRECTION of the association. The direction can be positive (upward) or negative (downward) or neither.



   a) Label each scatterplot as positive association, negative association, or neither.

   b) For a group of people at a bar, do you think the relationship between BAC and number of alcoholic drinks will be positive, negative or neither? Why do you think so?

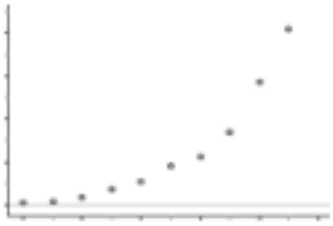
4) The scatterplots below differ in the STRENGTH of the association. The strength is how closely the data follow a pattern. Rank the scatterplots from strongest to weakest association.



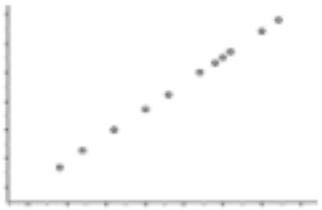
5) These scatterplots differ in FORM. Some have a linear pattern; some have a curved pattern (also called curvilinear).

a) Identify the scatterplots with a linear form.

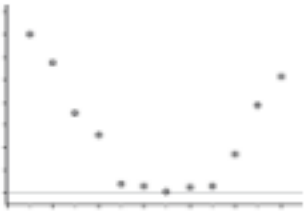
Scatterplot 1



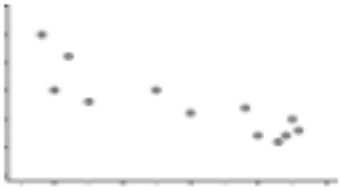
Scatterplot 2



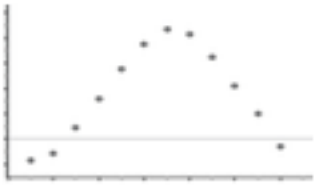
Scatterplot 3



Scatterplot 4



Scatterplot 5



Scatterplot 6