

# Interpreting Data in Graphs

## **Overview:**

This lesson is designed to help students in grades 5-7 create meaning from line graphs and scatter plots by developing a variety of strategies. Students will use line graphs and scatter plots to:

1. Examine patterns and relationships between data.
2. Describe changes and their effect on the data.
3. Use data patterns to make predictions beyond the data displayed in the graph.

## **Standards:**

- **5SDAP 1.4-** Identify ordered pairs of data from a graph and interpret the meaning of the data in terms of the situation depicted by the graph.
- **7SDAP 1.2-** Represent two numerical variables on a scatter plot and informally describe how the data points are distributed and any apparent relationship that exists between two variables (e.g. between time spent on homework and grade level).

## **Warm Up:**

### **Part 1: Posters**

Students will participate in a quick activity for the warm up. Each participant will be given 3 round stickers to write their initials on (or post it notes round in shape if possible to resemble data points) and respond to three graph posters placed on the wall around the room. The three warm up topics are:

1. Travel Time and Distance to School
2. Height and Foot Size (rulers and measuring tape can be provided; different colors can be used to distinguish between male and female students)
3. Hours of Sleep and Amount of Exercise

Once the data is all collected, engage in discussing the data with students. Pose questions to students like:

- Is there anything that you noticed right away?
- Anything that was surprising or that you did not expect? Any special cases? (outliers)

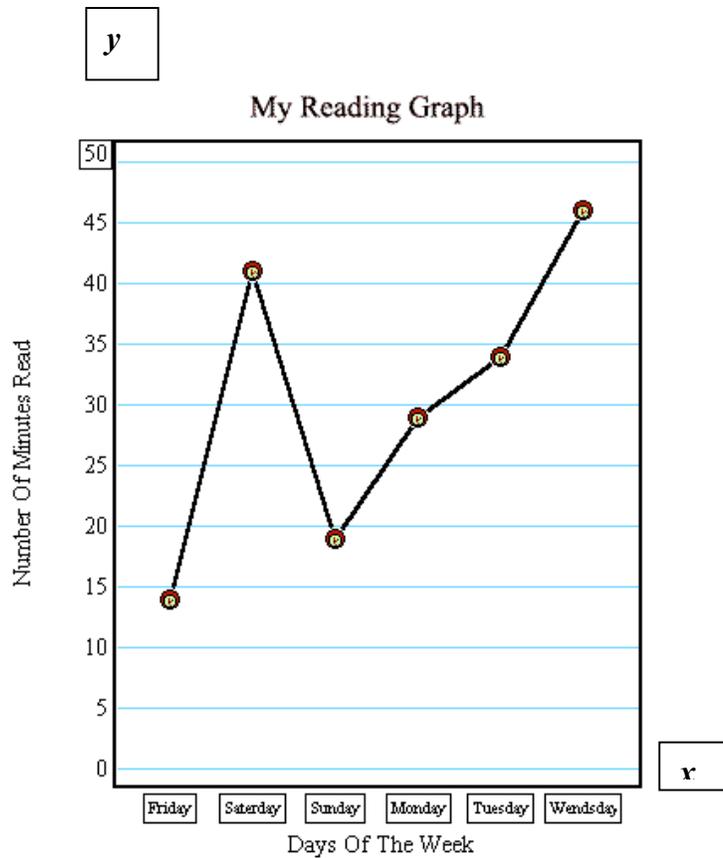
- Is there a relationship between time/distance to school? Height/foot size? Sleep/Exercise?
- What do the dots above/ below the line represent?
- What final conclusions can you make based on the data collected?

**Part 2: What’s the Story? (Overhead)**

Using the *Graph of the Trip* Overhead, have students write a brief story that describes the graph. Have students pay attention to the changes to the graph over time to describe the trip.

**Line Graphs:**

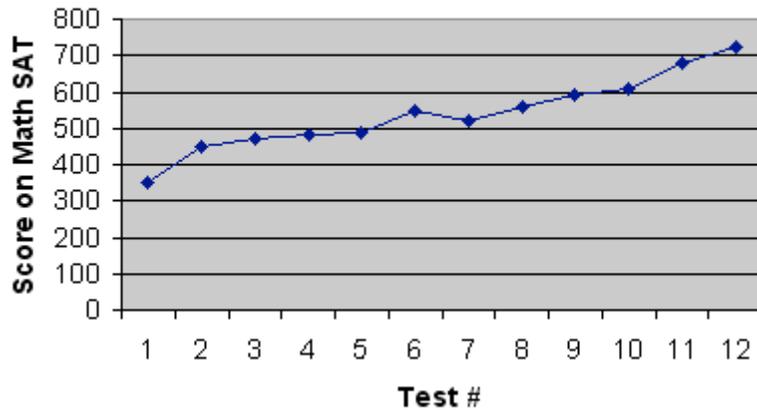
Line graphs are used to show changes or trends over time and relationships between two quantities. Frequently, time is shown on the horizontal (x) axis and another measure on the vertical (y) axis (i.e. height, weight, distance, speed, etc.).



A great way to introduce line graphs is to have students look at a few graphs without numerical values so they can focus on what the graph is telling them by the changes that are occurring to the line.

Students can also make future predictions based on the data in the graph.

### Scores on 12 Successive Math SATs



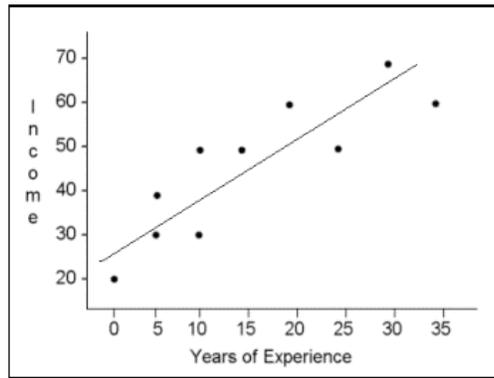
**Example:** I predict that this student will score more points on test # 13.

### Scatter Plots:

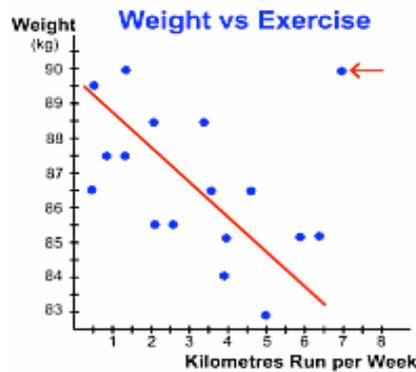
Scatter plots are the distribution of data points and any apparent relationship (correlation) that exists between two variables (i.e. height and weight).

There are three basic classifications for the relationships of scatter plots:

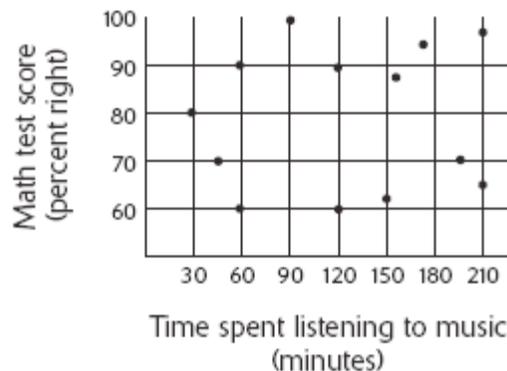
1. **Positive Relationship-** for every increase in variable *A*, there is a corresponding increase in variable *B*. (i.e. The more years of experience, the higher the income).



2. **Negative Relationship-** for every increase in variable  $A$ , there is a corresponding decrease in variable  $B$  (i.e. The more kilometers ran per a week, the less you weigh).



3. **No Relationship-** If there is no clear pattern between the two variables, then there is no relationship between variables  $A$  and  $B$ . (i.e. The amount of time spent listening to music had no effect on the math test score).



**Activity: Scattered Plots (Handout)**

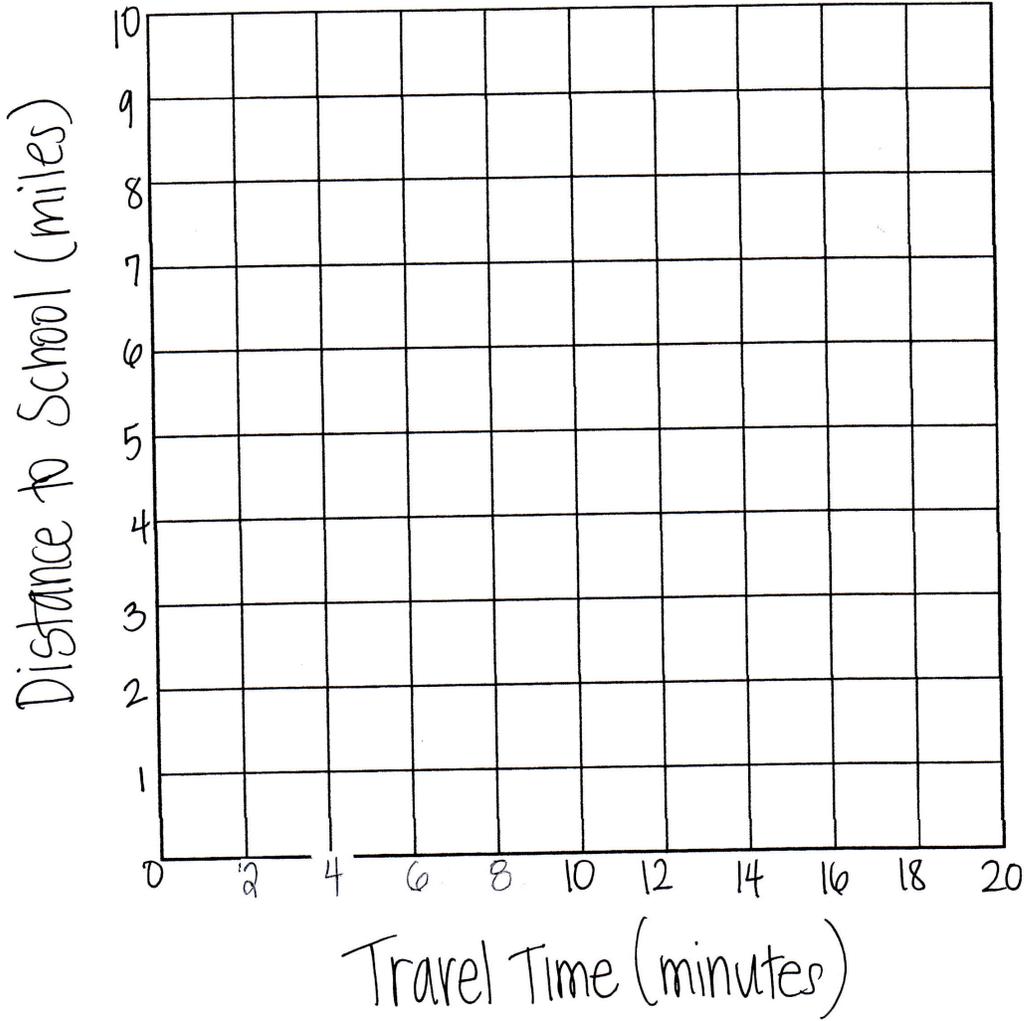
Working with a partner, students will be given six scatter plots to sort based on the relationship of the data (positive, negative, or no relationship). Students can use the spaghetti test to determine each graphs type of relationship. This involves students taking an uncooked spaghetti and using it as a ruler for the data points in each graph. For each graph, have students complete the cloze statements and write a prediction. Debrief whole group with sentence strips or on posters.

Variable A	Variable B	Correlation
As the time of day _____	the amount of rainfall _____	
When the average daily temperature _____	coffee sales _____	
When the percentage of unemployed _____	the percentage homeless _____	
As the amount of rainfall _____	the height of the plants _____	
As the GPA _____	SAT scores _____	
As the number of vehicles _____	the average speed _____	

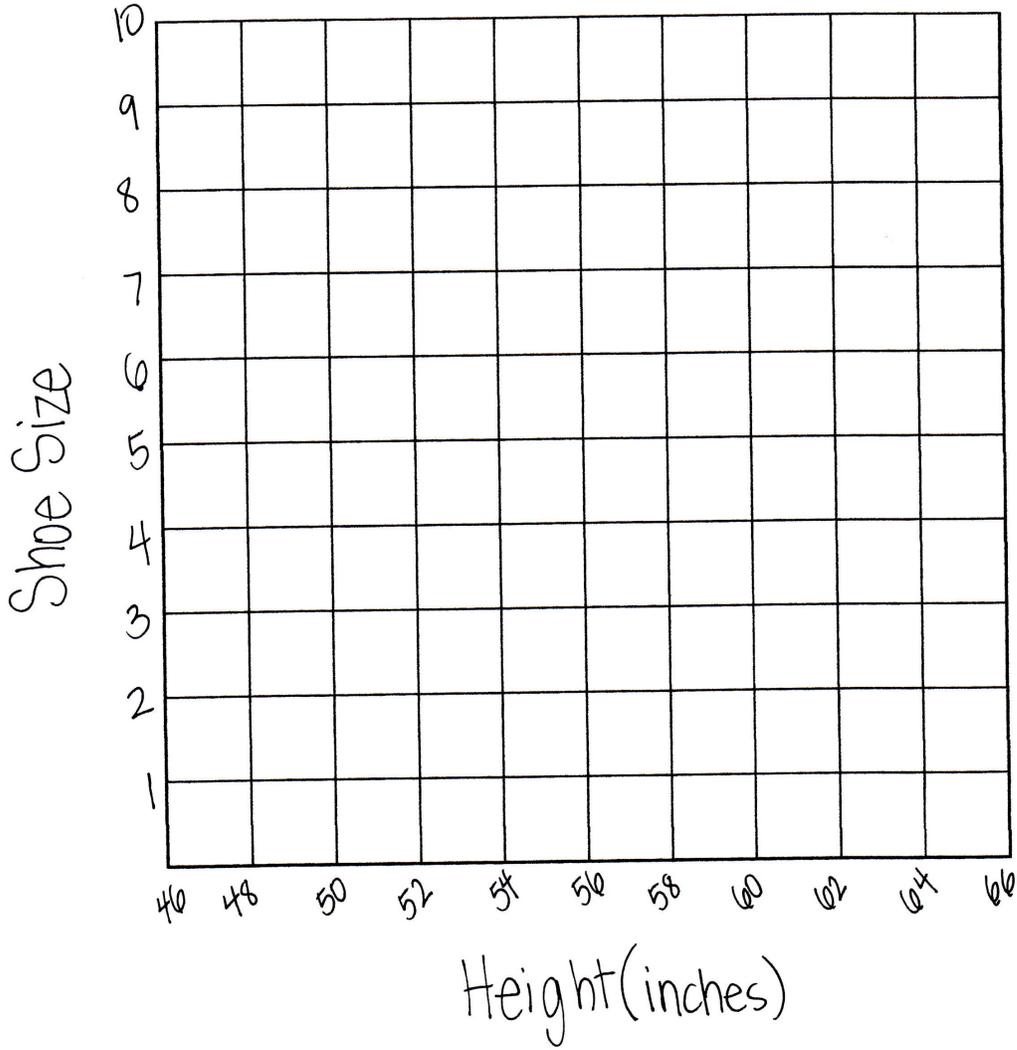
**Exit Problem:**

Showing students one graph on an overhead or poster, have students determine the relationship between the two variables and complete a concluding statement.

Warm Up: Poster #1  
Traveling to School

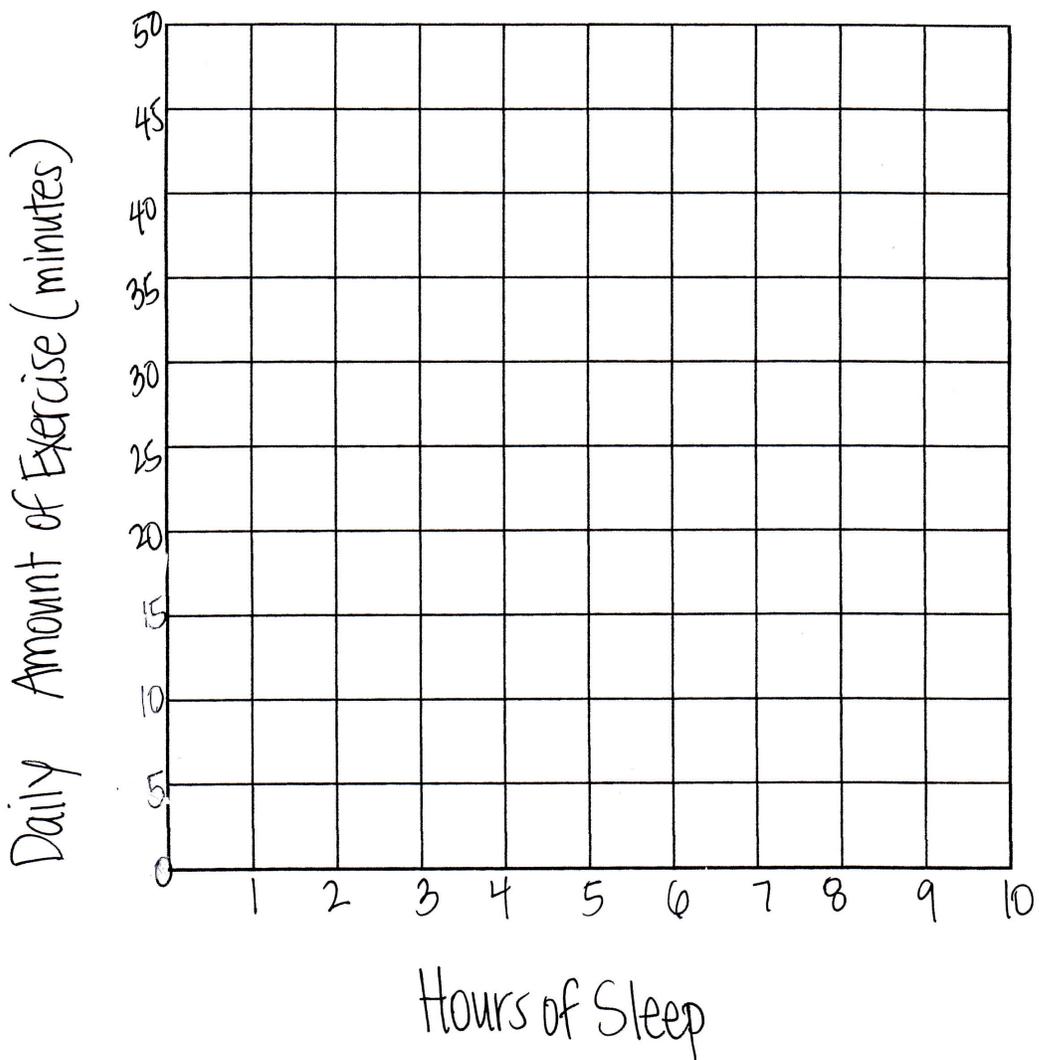


Warm Up: Poster #2  
Height and Shoe Size



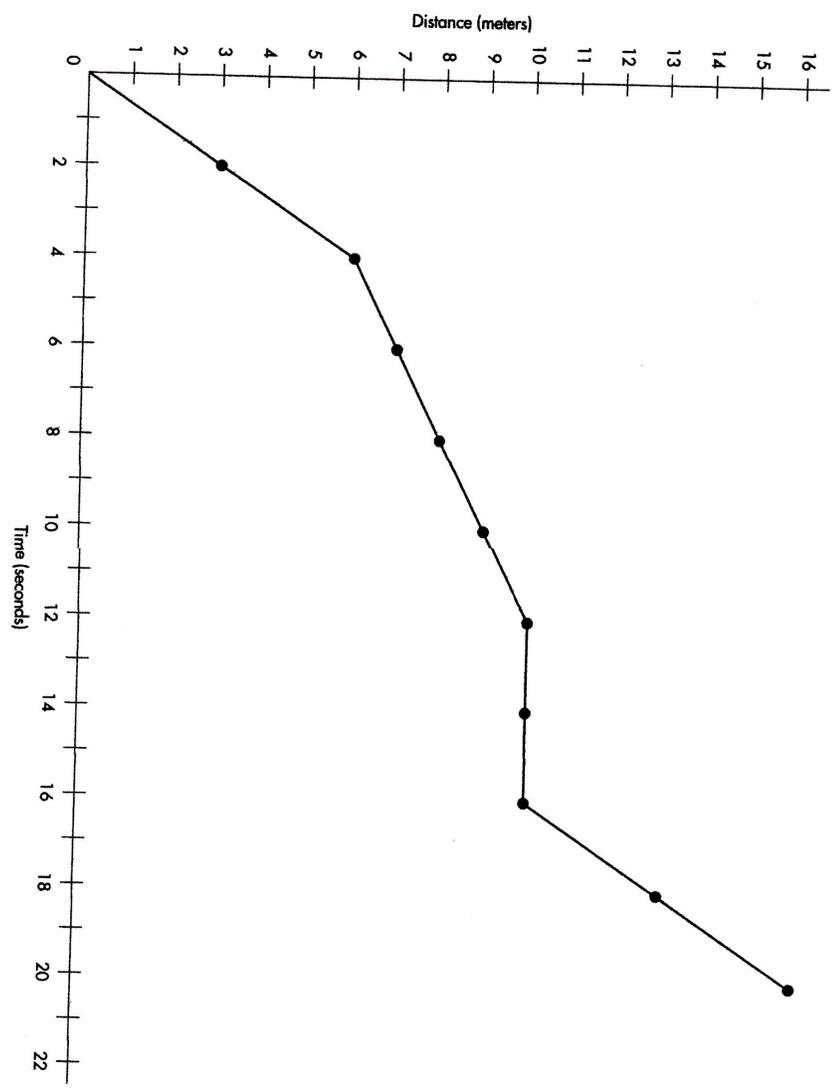
Key:  
Green = Male  
Red = Female

Warm Up: Poster # 3  
Daily Sleep and Exercise



Warm Up: What's the story?

**Graph of a Trip**



# Scattered Plots Sample Handout

Examine each of the scatter plots below. On the line below each plot, write whether the relationship shown between the two variables is "positive", "negative", or "no relationship".

