Activity Sheet

Examining Math Test Scores

Activity Part 1

During a department meeting at an elementary school, teachers began discussing the types of factors that may be related to student performance on the state mandated standardized mathematics tests taken each year.

List three factors that you believe might be related to student math achievement on such tests.

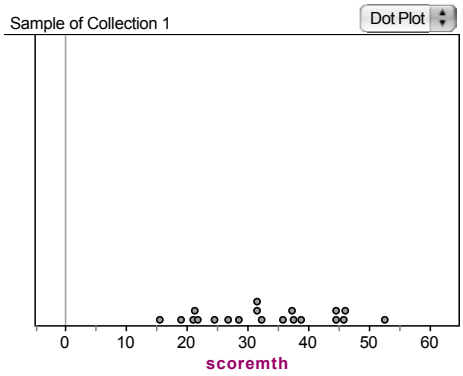
1.

2.

3.

How would you describe the relationship with achievement and each of the factors listed in 1-3?

Overall, there may be a lot of variation among student test scores. For example, here is a dotplot of math scores from a class.



What number do you think best represents the center math test score for this class? Why?

Describe the variation of the scores.

Refer to the plot and state *why* there is variation in the plot.

Describe the shape of the plot.

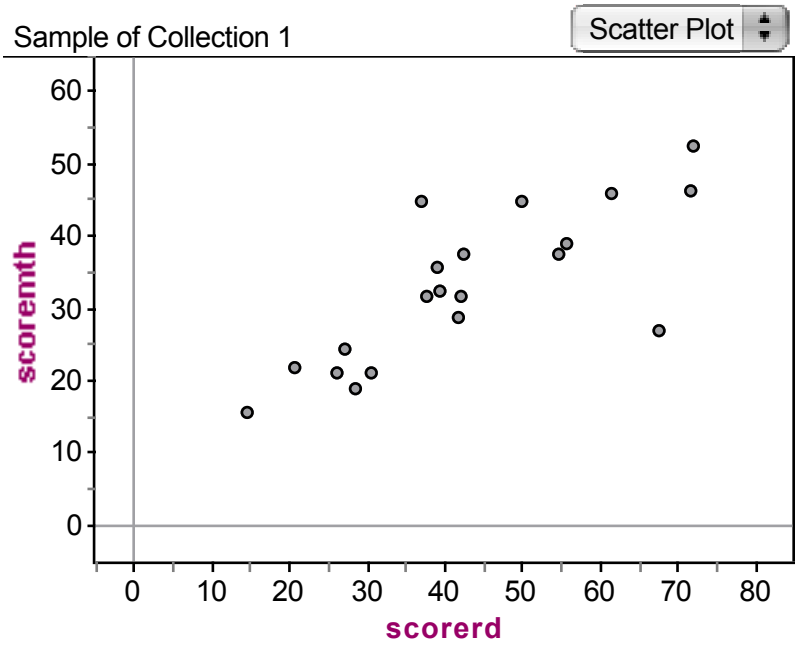
Activity Part 2

Math teachers, Mr. D, Ms. S, and Ms. B, at an elementary school want to understand whether their third grade students' performance on a math standardized test is related to their students' reading ability, the size of the classes at the school, and whether their home environments elicit learning. Because the math test requires them to read some word problems, they hypothesize that students with better reading ability will score higher on the math test.

Although having larger classes allows for effective small group activity, a teacher is not able to spend as much time giving individualized attention to the students. The math teachers are unsure whether class size will be linked to achievement, however, they hypothesize that the larger the class, the lower the math score.

Mr. D, Ms. S, and Ms. B decide that the number of books a student has in the home might be a good proxy measure of home opportunities to learn. They believe that the more books a student has at home, the better they will do on the math test.

Using data from a class, let's see if the data support their hypotheses. The following three scatterplots on the next page illustrate the relationships between math achievement and each of the potential factors.


Sample of Collection 1
Scatter Plot
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Sample of Collection 1
Scatter Plot
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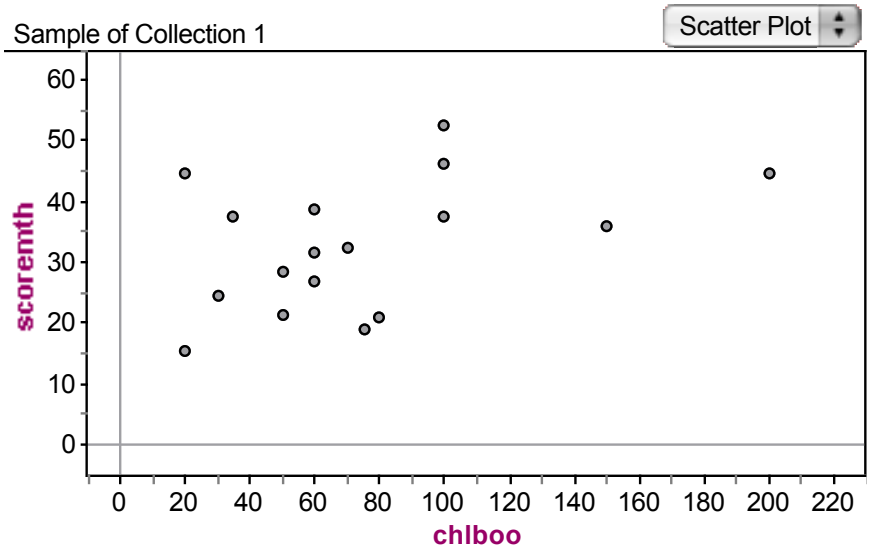
Sample of Collection 1
Scatter Plot
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Instructions

Does the student data support the teachers' hypotheses? Explain why or why not.

Describe the relationship between the math score and the other factors.

What kind of relationship is there between math score and reading score?

What kind of relationship is there between math score and class size?

What kind of relationship is there between math score and number of books a child has in the home?

How can these relationships be modeled?

Determine where you think the line of best fit should be placed on each of the scatterplots above by manipulating a piece of spaghetti or wire. Draw your line on each scatterplot once you have determined its best placement.

Describe how you decided to place the lines of best fit for EACH of the scatterplots. In other words, why did you place the lines where you did in each of the plots?

Suppose a teacher at another elementary school in the district wanted to predict how students in his class were going to perform on the upcoming standardized math test. This teacher was aware of the modeling work Mr. D, Ms. S, and Ms. B did and decided to use their models for his prediction purposes. In particular, he was interested in seeing where a student with the following characteristics might perform:

Student A: Reading score of 73.

Student B: Reading score of 70.

Student C: Zero books in the home.

Use your line to predict a student's math test score if the student's reading score is 73. Is the prediction reasonable?

Use your line to predict a student's math test score if the student's reading score is 70. Is the prediction reasonable?

Use your line to predict a student's math test score if the student has no books in the home. Is the prediction reasonable?