

Constructing and Analyzing Scatterplots

Strand:	Probability and Statistics
Topic:	Constructing and analyzing scatterplots
Primary SOL:	8.13 The student will a) represent data in scatterplots b) make observations about data represented in scatterplots

Materials

- Hula hoops
- Timer
- Hula Hoop Recording Sheet (attached)
- Sample Scatterplots (attached)

Vocabulary

title, labels, x-axis, y-axis (earlier grades)

positive linear relationship, negative linear relationship, correlation, dependent variable, independent variable, line of best fit, scatterplot, trend (8.13)

Student/Teacher Actions: What should students be doing? What should teachers be doing?

1. Explain that students will play a game to gather data for a scatterplot. Discuss how scatterplots are created and the types of data (bivariate) for which they are used.
2. Have a class discussion about labeling the axes. Ask students about the location of the x-axis and the location of the y-axis.
3. As a class, make a list of relationships that could be shown with scatter plots. Have students identify the independent (x) and dependent (y) variables. Also, have students identify whether the relationship would have positive linear relationship, a negative linear relationship, or possibly no linear relationship. Point out to students that the relationship between variables is not always linear, and may be modeled by other types of functions (e.g. quadratic, exponential, etc.) that are studied in high school and college level mathematics.
4. Explain that independent variables are typically represented on the x-axis and dependent variables on the y-axis.
5. Ask students whether there are relationships where both sets of data could represent the independent and dependent variables.
6. Divide the class into groups of six or seven, and hang a hula-hoop on the arm of one student in each group. Explain the game. Members of each group will stand in a circle facing each other and join hands. They will move the hoop around the circle while continuing to hold hands and without touching the hoop with their hands. Each student must climb through the hoop when it comes to him/her and move it on without using his/her hands. Each group will count the number of students who get entirely through the hoop during the round. The object of the game is to have as many students pass through the hoop as possible during the time allotted for each round. Discuss what variables might

- be represented in this situation and which might be the independent variable (length of time) and which is the dependent variable (number of people who pass through the hula hoop).
7. Tell students the time period for the first round, and give the signal to start.
 8. Give the signal to stop after the predetermined length of time. Distribute the Hula Hoop Recording Sheet, and have each group record the time of each round and how many people made it through the hoop within that round.
 9. Repeat the process several times, using different lengths of time, with students continuing to record the number of seconds and the number of passes through the hoop.
 10. Now, have students use the data they collected to create scatterplots. Guide them in labeling the axes and plotting the points.
 11. Discuss as a class what their scatterplots suggest about the data, and have students describe the relationship between the independent and dependent variables. Also, challenge students to make predictions about the number of students who would make it through the hoop for other, different periods of time.
 12. Have students use [Desmos graphing calculator](https://www.desmos.com/calculator) software to create a digital graph. Students may wish to make a table of ordered pairs. Students and teachers can learn more about creating tables of values using the Desmos graphing calculator at <http://learn.desmos.com/tables>.
 13. As a final activity, display sample scatterplots (the attached and/or others), and ask students to describe the relationship shown in each and predict what the graph could be representing.

Assessment

- **Questions**
 - What is a situation that would represent data with a positive relationship?
 - What is a situation that would represent data with a negative relationship?
 - What is a situation that would represent data with no relationship?
- **Journal/Writing Prompts**
 - Describe a situation for which creating a scatterplot would be useful.
 - Explain the difference between a positive, a negative, and no linear relationship, and provide a real-world example of each.

Extensions and Connections (for all students)

- Have students collect their own data and create their own graph. Then, have them develop questions to be answered about the graph.
- Provide students with data, and have them identify, without graphing, whether the relation has a positive linear relationship, negative linear relationship, or no linear relationship.

Strategies for Differentiation

- Review how to label a graph and create the intervals on an axis before having students create a scatterplot for the collected data.
- Review how to plot points on the coordinate plane.

Mathematics Instructional Plan – Grade 8

- Provide students with a graph, labeled with the x - and y -axes, before they create a scatterplot from the collected data.
- Use a smaller data set with whole numbers less than 10.
- Have students use Desmos software to create different tables of data that have positive and linear relationships. Challenge students to create data sets that have other types of relationships that are not linear.

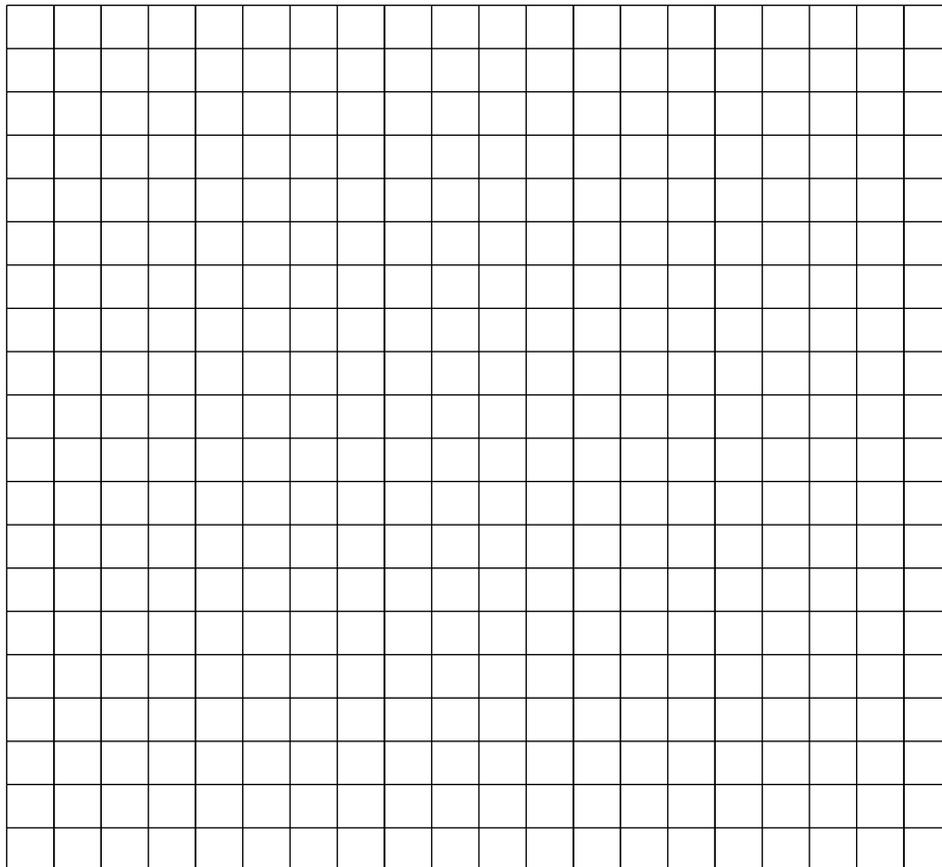
Note: The following pages are intended for classroom use for students as a visual aid to learning.

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Hula Hoop Recording Sheet

Name _____ Date _____

Round	Number of Seconds	Number of Passes through Hoop
1		
2		
3		
4		
5		
6		
7		



A large empty grid consisting of 20 columns and 20 rows, intended for graphing the data from the recording sheet.

Students could use the [Desmos graphing calculator](#) software to create a digital graph.

- **Sample Scatterplots**

