

THEFT AT THE MUSEUM – SCATTER PLOT/ LINE OF BEST FIT MYSTERY ACTIVITY

COMMON CORE STANDARDS:

CCSS.MATH.HSS.ID.B.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

CCSS.MATH.HSS.ID.B.6.A Fit a function to the data; use function fitted to data to solve problems in the context of the data.

CCSS.MATH.HSS.ID.C.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.

MATERIALS NEEDED: rulers, calculators, and colored tape (to mark jumping start and end)

SKILLS USED:

Measuring using rulers, converting feet to inches, organizing data into x-y tables, creating scatter plots and making choices about intervals on x-y axis, using technology to find a line of best fit and correlation coefficient, using line of best fit to predict, interpreting mathematics in the context of a real-world situation, and writing a one page summary on mathematics used.

DIRECTIONS:

Students will use the accompanying worksheets to read about the mystery situation regarding a theft at a museum. The mystery can be solved by determining how far the suspects can jump since one of the suspects jumped over the security alarmed portion of the floor. They will work to measure each other's height and distance jumped from a standing position. Using this data, they will create a scatter plot and line of best fit. Then they will use the line of best fit to predict the jumping distances of the suspects. After analyzing their data, including the strength of their data through the correlation coefficient, students will reach a conclusion about the thief. A one page investigative report will be written to summarize the procedure students used to determine the guilty suspect. A rubric is included as a suggested grading guide.

Grouping Suggestion:

Let students work in small groups of 2 or 3 to measure height and jumping distances within their group and also to work on the mystery investigation together. Allow students to use the white board to add to the class-wide data in the form of an x-y table. This grouping strategy will ensure that each student gets experience taking measurements with a ruler.

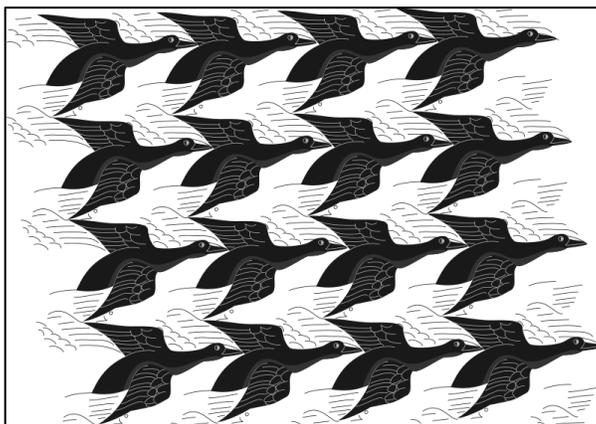
If your class gets along well, this activity is great for independent student-choice of groups.

If you prefer to choose their groups, a great way to differentiate is by heterogeneous grouping, encouraging group efforts and student-led cooperative learning.

THEFT AT THE MUSEUM

SCATTER PLOT/ LINE OF BEST FIT MYSTERY ACTIVITY

Le Musée de Mathématiques needs your help! A theft has occurred overnight of one the most prized mathematical pieces of artwork by renowned artist M.C. Escher. His work explored mathematical concepts of infinity, reflection, hyperbolic geometry, and tessellations. An example of a tessellation, a picture where a repeated pattern is created without gaps or overlapping, is shown in the picture below.



At night, the electronic security system to protect the entrance of the museum is turned on. The security system features a highly sensitive alarm to anything that may touch the floor. However, the security system has been in need of repair and only the first 7 feet of the floor has been in working condition. Investigators believe the culprit is an employee of the museum due to the fact that no one in the public would have known about the security system being in need of repair. There are 5 suspects who knew that the security system was broken; the curator, the art appraiser, the janitor, the technology specialist, and the museum guide.

Investigators must determine who is the bandit. They realize that the thief had to jump over the first 7 feet of the floor because the security system of that part of the floor was in proper working condition. Help the investigators apprehend the robber by conducting an investigation. Collect data in the form of a table on how far your classmate's can jump and measure their height. Organize your data into a scatter plot and create a line of best fit. Use your line of best fit to make an expert mathematical opinion and help the investigators solve this mystery!



Jan
Position: Curator
Height: 5'7"



Todd
Position: Art Appraiser
Height: 6'1"



Martin
Position: Janitor
Height: 5'6"



Neil
Position: Tech Specialist
Height: 5'5"

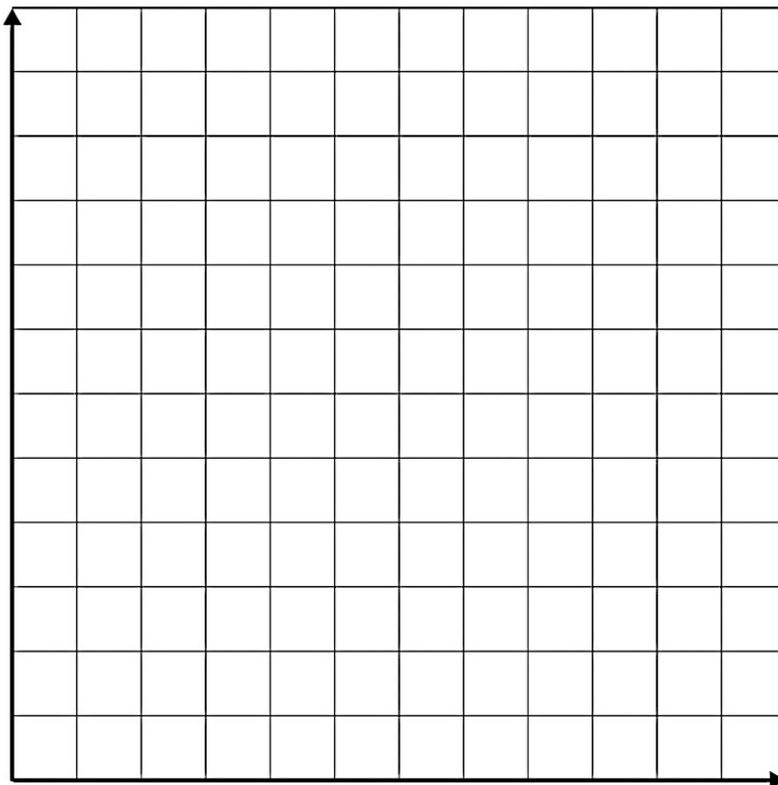


Jamie
Position: Museum Guide
Height: 5'8"

INVESTIGATION PROCEDURE – CASE: THEFT AT THE MUSEUM

1. **Collect Data** – Measure the heights of individuals and how far they can jump from a standing position.
2. **Organize Data** – Create an x-y table using the heights of the individual as the independent variable, and the distance jumped as the dependent variable.
3. **Graph Data** – Plot the points from the table to create a scatter plot. Be sure to include proper intervals, titles on the axes, and title for the graph as a whole.
4. **Analyze Data** – Use technology to create a line of best fit for the data collected and find the correlation coefficient. Then draw the line of best fit onto the scatter plot.
5. **Interpret Data** – Use the line of best fit to make scientific estimates on how far each suspect can jump. Be careful with the units!
6. **Report** - Write a report on your conclusion by including: the identification of guilty suspect, the procedure used to determine guilt, and strength of reasoning by interpreting the correlation coefficient.

x, height (in _____)	y, distance jumped (in _____)



Linear Regression Equation: _____ Correlation Coefficient: _____

Analysis of each suspects jumping distance, based on the line of best fit:

Jan	Todd	Martin	Neil	Jamie

RUBRIC:
THEFT AT THE MUSUEM – SCATTER PLOT/ LINE OF BEST FIT
MYSTERY ACTIVITY

Task	Point(s) Earned/ Total Points
a) Organize data collected on height of individuals and their standing long jump into an x-y table	_____ / 1
b) Correctly plot points c) Accurate intervals on x and y axis d) Properly labeled titles for x and y- axes and main title	_____ / 3
e) Use technology to find line of best fit f) Use technology to find correlation coefficient g) Accurately draw line of best fit onto scatter plot	_____ / 4
h) Use line of best fit to determine how far each suspect can jump	_____ / 2
i) Final Report includes: <ul style="list-style-type: none"> • Identification of thief • Thorough explanation of all the steps used to make a conclusion • Interpretation of correlation coefficient and what it means for the strength of your argument regarding the identification of the thief 	_____ / 10
	TOTAL POINTS: _____ / 20

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