Can Eating Fish Prevent Murder?

Key Learning Content

This film introduces the idea of correlation and its link with causation. It illustrates the concept by using the example of falling homicide rates correlated with rising seafood consumption across different countries. Positive, negative and zero correlation are defined and illustrated using scatter plots on screen. The difficulty of proving causation is discussed, and the film concludes that the correlation does not show a straightforward causal relationship between fish consumption and homicide.

Familiarity with graph plotting and interpreting graphs would be useful prior to viewing the film.

Core Outcomes

Learning Points

- Be able to interpret statistical diagrams.
- Be able to understand and recognise positive, negative and zero correlation from scatter graphs.
- Be able to understand that correlation does not imply causation.

Suggested Activities

- Review scatter plots of different data sets plotted against each other and assess correlation between the data sets.
- Collect data from the group and plot to assess possible correlation.

Oily fish contains omega-3 fatty acids, which have long been associated with brain function and behaviour.

Extension Outcomes

Learning Points

- Be able to set up problems involving inverse proportion and relate algebraic solutions to graphical representation of the equations (to include $y \propto 1/x$, $y \propto 1/x^2$)
- Be able to assess correlation using the correlation coefficient, r.

Suggested Activities

- Model homicide rates as inversely proportional to fish consumption and investigate what a scatter plot of the two variables would then look like.
- Calculate the correlation coefficient r for two data sets and compare the numerical value of correlation with correlation assessed from the scatter plot.

Related Films

To use before the lesson plan:

Most Popular Pet	This film introduces simple statistical charts, including a scatter plot.
Coordinate Geometry: Descartes	This film features Descartes, the mathematician and philosopher who invented Cartesian Coordinates, used in scatter plots.
Cumulative Frequency: You're Fired?	This film shows how cumulative frequency curves have been used by companies to hire and fire employees.

To use after the lesson plan:

Can Fish Oil Make You Smarter?	This film details a statistical experiment that tried to establish a correlation between eating fish products and students' ability to concentrate and learn.
The Richter Scale	This film examines a negative correlation between the magnitude and frequency of earthquakes.

Guide Lesson Plan

Introduction

Ask the students what they think homicide rates are in different countries; which countries have many murders and which have few? Ask the students why they think there might be differences between different countries. Ask how they might test their ideas.

Show Film

Can Eating Fish Prevent Murder?

Main Activity

Foundation

If possible, gather social and economic data for different countries and plot against homicide rates, as in the film. Get students to review the scatter plots and assess correlation between the data sets. Interpret the scatter plots, suggesting different causes of homicide rates. Then plot scatter plots of causal factors against each other to see if possible causes are correlated. Group possible causes according to their correlation and interpret the results.

Main Activity cont ...

Advanced

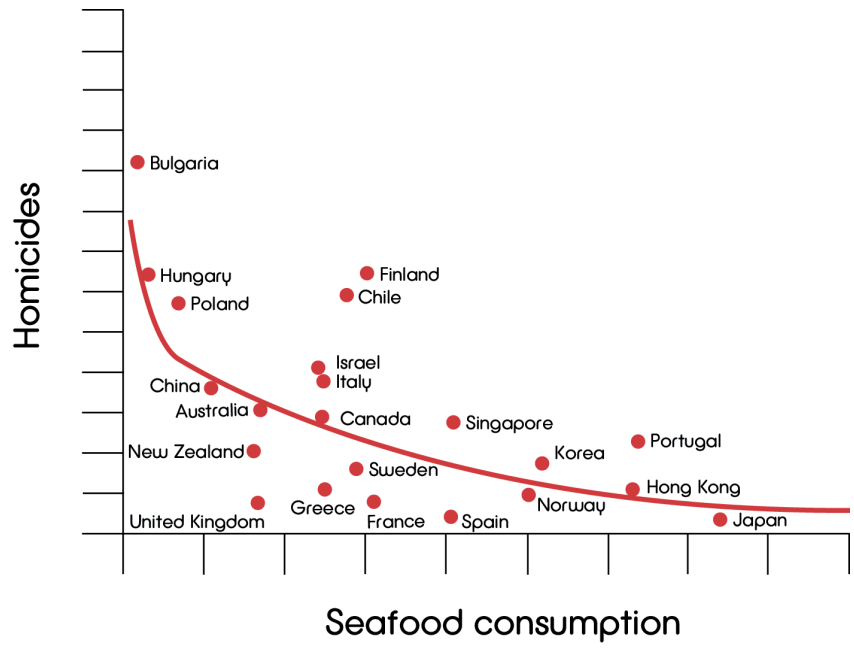
Review the scatter plot shown in the film and ask students how strong they think the negative correlation is, based on the data points. Get students to describe the shape of the points plotted and agree it is a curve which asymptotes to both axes, rather than a straight line. Then get students to plot graphs of $y \propto 1/x$, $y \propto 1/x^2$, and compare with the shape of the scatter plot shown in the film. Ask students to write an equation linking homicide rates to fish consumption, based on the shape of the scatter plot.

Extension Activity

Get students to collect data from the form which they think will demonstrate correlation (e.g. height vs weight, height vs arm span, distance from school vs travel time to school). Plot data, assess correlation and interpret the results.

Optional Extra

Explain that correlation can be assessed using a formula and give the formula for the correlation coefficient, r. Get students to calculate the correlation coefficients for the data collected above.



This graph shows that as fish consumption increases, homicide rates decrease.