Cumulative Frequency: You're Fired?

Key Learning Content

This film demonstrates the use of a cumulative frequency curve to calculate the median and quintiles (20% divisions) of grouped data. It tells the story of the unfortunate employees of Enron, a once-successful US company. The top 20% of employees received bonuses, while the bottom 20% lost their jobs. Frequency and cumulative frequency data for profit per employee are tabulated, then plotted on an S-shaped cumulative frequency curve. The median calculation is then shown on screen, as well as the top and bottom 20%.

Familiarity with data tabulation and graph plotting is assumed prior to watching the film.

Core Outcomes

Learning Points

- Be able to understand the concept of the median and quartiles of grouped data.
- Be able to construct cumulative frequency diagrams from tabulated data.
- Be able to estimate the median from a cumulative frequency diagram.

Suggested Activities

- Interpret cumulative frequency curves and calculate medians from them.
- Collect data and draw cumulative frequency curves.

One way of finding out how employees rank against each other is to use a cumulative frequency graph.

Extension Outcomes

Learning Points

- Be able to estimate the interquartile range from given data or from a cumulative frequency diagram; the terms upper quartile and lower quartile may be used.
- Be able to interpret and construct box-and-whisker plots from the cumulative frequency curve.

Suggested Activities

- Calculate quartiles and interquartile ranges from cumulative frequency curves, and compare and contrast data sets.
- Draw box-and-whisker plots from cumulative frequency curves.

Related Films

To use before the lesson plan:

Most Popular Pet	This film demonstrates the use of simple charts to present data.
Average Joe	This film introduces the three types of average and illustrates their use.

To use after the lesson plan:

Can Eating Fish Prevent Murder?	This film highlights a negative correlation between fish consumption and homicide rates and asks whether one is linked to the other.
Histograms: Snapshot	This film shows how a frequency chart is used to help photographers take a perfect picture.
Why Do Shares Change Price?	This film establishes a link between what companies do and what happens to their share price.

Guide Lesson Plan

Introduction

Ask students what they think should happen to those who get top marks in a test, and those who come at the bottom? Should those at the top be rewarded and those at the bottom be thrown out of the school? Could they ever imagine a business being run this way? Would they like to work for such a business?

Show Film

Cumulative Frequency: You're Fired?

Main Activity

Foundation

Show examples of cumulative frequency curves and ask students to interpret them by calculating the number of observations between given bounds. Then calculate medians from the cumulative frequency curves. Collect data from the group on the number of hours they spend on the internet each week and draw a cumulative frequency curve from the data.

Advanced

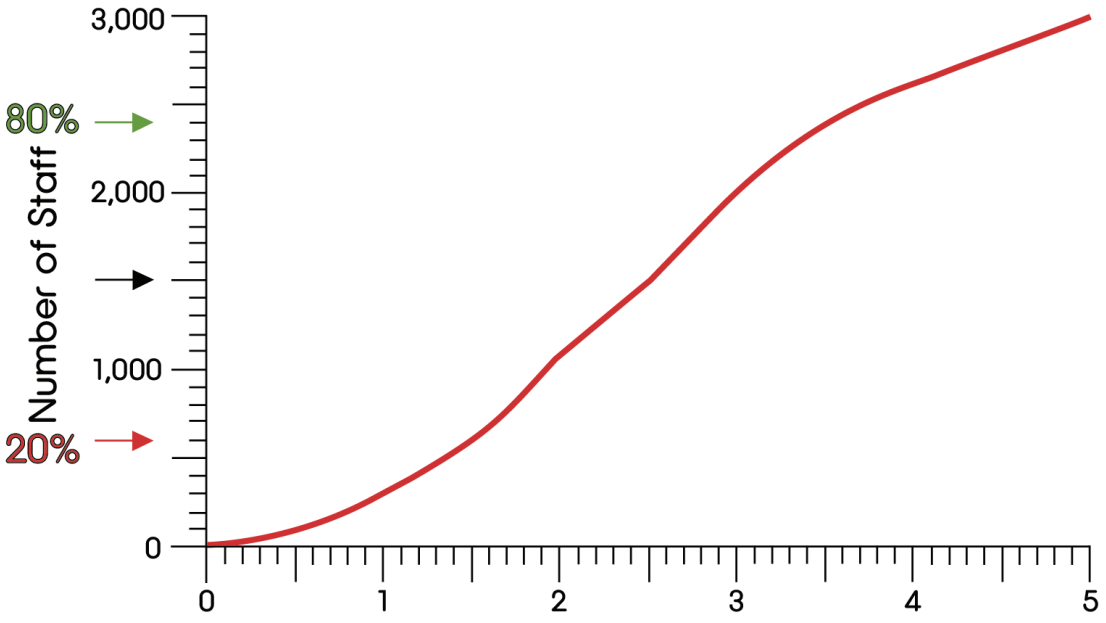
Explain quartiles and the interquartile range then calculate these for given cumulative frequency curves. Collect data and plot curves from the data. Explore what the interquartile range means in terms of the spread or dispersion of the data. Ask students why interquartile range might be a better measure of spread than simply the range of the data (= maximum - minimum).

Extension Activity

Show cumulative frequency curves for two different data sets, e.g. exam results for two different groups. Calculate medians, quartiles and interquartile range for each data set. Compare and contrast results, and test students' intuition by showing two cumulative frequency curves drawn on the same axes and asking which set of results is better. Find examples where the data set with the higher median also has the higher interquartile range and get students to discuss which set of results is better.

Optional Extra

Explain what a box-and-whisker chart is and construct one underneath a cumulative frequency curve by 'dropping down' lines for maximum and minimum, quartiles and medians.



Cumulative frequency keeps a running tally of the total frequency up to the maximum profit of any given set. This graph can be used to find out whether employees will be rewarded, or fired.