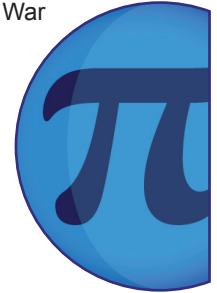




Nightingale's Diagram

Key Learning Content

This film tells the story of English nurse Florence Nightingale's efforts to save lives during the Crimean War by improving hygiene standards. Florence Nightingale devised the rose diagram, a type of pie chart, to illustrate deaths-per-month before and after hygiene changes were introduced. An example is given, clearly showing the dramatic reduction in deaths. The importance of clear diagrams to convey mathematical information is emphasised.



Core Outcomes

Learning Points

- Be able to understand angle measure and how to measure an angle to the nearest degree.
- Be able to construct pie charts.
- Be able to interpret and use information presented in graph form.
- Be able to interpret statistical diagrams.

Suggested Activities

- Construct simple pie charts from frequency data.
- Construct a rose diagram for a single variable.

Extension Outcomes

Learning Points

- Be able to recognise the terms 'centre', 'radius', 'chord', 'diameter', 'circumference', 'arc', 'sector' and 'segment' of a circle.
- Be able to find circumferences and areas of circles using relevant formulae.
- Be able to find perimeters and areas of sectors of circles (radian measure is excluded).
- Be able to set up problems involving direct proportion, and relate algebraic solutions to graphical representation of equations.

Suggested Activities

- Construct a rose diagram for several variables with radius proportional to frequency.
- Construct a rose diagram for several variables with area proportional to frequency.
- Construct a stacked rose diagram for several variables.
- Review and interpret well-known examples of statistical diagrams.



Florence Nightingale discovered that her Rose Diagram, one of the world's first pie charts, put across information in a clear and concise way.

Related Films

To use before the lesson plan:

Most Popular Pet

This film shows data for pet ownership and presents it in different ways in order to identify the most popular pet.

To use after the lesson plan:

Histograms: Snapshot

This film provides an example of how a complex type of mathematical chart helps photographers take better pictures.

Can Eating Fish Prevent Murder?

This film asks whether correlation between data proves any causal link.

Can You Trust Your IQ?

This film takes a closer look at the distinctions between different types of data.

Guide Lesson Plan

Introduction

Ask students to name any famous mathematicians they know, then go through the answers to see how many are men. Ask the students if they know of any female mathematicians. Then ask them what they know about Florence Nightingale.

Show Film

Nightingale's Diagram

Main Activity

Foundation

Explain that Nightingale's rose diagram has similarities to the simple pie chart and show examples of pie charts. Go through how to construct a pie chart from frequency data, including the usual conventions about the order of sectors and the position of the largest sector. Get students to draw pie charts for data collected from the form. Review results. Ask students whether the total area of the pie chart signifies anything.

Advanced

Explain that Nightingale's rose diagram is different in several ways from a simple pie chart and illustrate by example. Hand out copies of the rose diagram and the original data and get students to work out precisely how it was drawn. Explain what a sector of a circle is, and how to calculate its arc length and area. Then get students to construct rose diagrams where (a) frequency is proportional to radius and (b) where frequency is proportional to area.

Extension Activity

Show two different rose diagrams for the same data, one drawn where frequency is proportional to radius, and one where frequency is proportional to area. Get students to compare and contrast the two diagrams and comment on their appearance. Ask students which they would choose to show, depending on the message they wished to get across. Stress the importance of understanding how statistical diagrams are drawn before interpreting them.

Optional Extra

On the internet, find an image of the map drawn by Charles Joseph Minard showing the losses suffered by Napoleon's army in 1812 after the French attempt to invade Russia. Show it to the students and explain that this is one of the most famous statistical diagrams ever drawn. Get students to interpret the diagram and write a commentary from the map about the ill-fated campaign.

