

Making Sense of Data Work Scheme

This FSMQ requires a total of 60 guided learning hours that could be timetabled in a variety of ways eg 2 hours per week for 30 weeks, 4 hours per week for 15 weeks, 5 hours per week for 12 weeks. A suggested work scheme showing topics and methods to be covered is given below. There is plenty of scope for varying the order and time allocation.

The following techniques should be introduced as soon as possible and used throughout the course:

- using tables to record results
- using spreadsheets to carry out calculations and display results in tables and statistical charts and graphs
- checking calculations using estimates, inverse operations and different methods.

Although the topics are listed separately, it would be beneficial to follow a number of statistical investigations through from the initial collection and organisation of data to an analysis of the situation making use of statistical charts and measures. Where possible these investigations should reflect the students' other areas of work and interests.

Topic Area	Content	Nuffield Resource	Coursework Portfolio Requirements
Collecting and organising data (5 hours)	Collect data (including tally charts). Organise data on paper and spreadsheets (compare different ways of doing this). Express one quantity as a proportion (fraction, decimal, %) of another. Express two quantities as a ratio, reducing to simplest form. Divide a quantity in a given ratio.	Coffee Shop (starter) Table of information about customers at a coffee shop. Use on paper or in spreadsheet form for discussion and practice of statistical techniques.	Requirement 1 (1 hour) Two tables of data from two different situations, one drawn using a spreadsheet and the other by hand.
		Fractions, Decimals and % (skills activity) Series of worksheets for practice in converting between fractions, decimals and percentages. Includes Teacher Notes with weblinks to useful internet resources.	
		Ratio Bingo & Matching Cards (skills activity) Activities that give learners practice in simplifying ratios.	
		% Cross-number (skills activity) Can be used at the end of work on percentages or for revision.	
		% Cards (skills activity) 3 sets of cards for matching fractions, decimals and %.	
		% Follow Me (skills activity) Group activity to give practice in converting between fractions, decimals and %s.	
Statistical Charts (9 hours)	Draw pictograms and bar charts by hand. Draw bar charts and pie charts using a spreadsheet. Draw pie charts by hand. Include common equivalencies for simple fractions, decimals and percentages.	Draw line graphs in Excel (starter) Activity that shows students how to draw line graphs in Excel.	Requirement 2 (1½ hours) Two different types of statistical diagrams and two different statistical measures illustrating data from up to two different situations. At least one diagram and at least one measure should be produced on a spreadsheet.
		Draw pie charts in Excel (starter) Activity that shows students how to draw a pie chart in Excel and change its appearance.	
		Pie Charts (starter) Activity that shows students how to draw a pie chart by hand. Also includes practice exercise with real data – this can also be used as follow up to 'Draw pie charts in Excel' activity.	
		Acid Rain (skill activity) Worksheet explains how acid rain is produced and requires students to analyse the data given in the accompanying spreadsheet.	
		Heights and Weights (assignment) Data set of girls' and boys' heights and weights from which students select data, then calculate statistical measures and draw statistical diagrams.	



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Statistical Measures (8 hours)	Find sum, mean, mode, median and range of data with and without a calculator. (Include use of the calculator's memory.) Use a spreadsheet to sort data and find the sum, mean, median, mode and range. Print out spreadsheet formulae.	On Average (skills activity) Examples and exercises on mean, mode and median.	Requirement 6 (1 hour) Print outs showing the results of statistical work and the formulae used.
		Election Results (skills activity) Spreadsheet containing the 2001 and 2005 General Election Results. Select local data for practice in drawing charts, finding % etc.	
		Body Mass Index (assignment) Illustrates how work from GNVQ Intermediate Science may be adapted for Making sense of data. Involves collecting and illustrating data using a spreadsheet.	
		Football Figures (skills activity) Excel spreadsheet containing 2007-8 data for each premier league club. Teacher Notes suggest uses.	
		Computer Survey (assignment) Students design a questionnaire about computer usage, carry out a survey and analyse the results	
		Pay Survey (assignment) Investigation into how much paid work students do.	
Line Graphs and Proportionality (10 hours)	Recognise when one set of data is proportional to another by considering step changes. Draw line graphs by hand. Draw line graphs using a spreadsheet. Recognise the graph of data that is directly proportional: straight line passing through the origin. Find the gradient of a graph of a situation involving direct proportionality. Find the equation relating two variables that are directly proportional from a graph or information given in words.	Holiday Money (starter) Examples, exercise and experiments including currency exchange and many other topics involving direct proportionality.	Requirement 3 (2 hours) Two different graphs of data pairs representing two different situations and a brief description of each graph. One graph should be drawn using a spreadsheet and the other by hand. One graph must show direct proportion.
		Line Graphs (skills activity) Examples and exercises on conversion graphs and other linear graphs. Includes use of a spreadsheet.	
		Reaction Rates (skills activity) Drawing and interpreting graphs using data provided from chemical reactions. Requires graphs to be drawn using spreadsheet and by hand.	
		Climate (skills activity) Excel spreadsheet containing sunshine, rainfall and temperature data for England and Wales, Northern Ireland and Scotland for each month in every year from 1961 to 2003.	
		House Prices (skills activity) Excel spreadsheet containing house price data from 1983 to 2007 for each country and region of the UK. Introduction suggests uses.	
		Graphs (skills activity) 12 pairs of cards for students to match. One card in each pair shows a graph and the other gives a description of the real situation that the graph represents. Powerpoint presentation to aid discussion (same graphs with titles & labels).	
		Map Distances (assignment) Compare distances found from a table and map, then plot a scatter graph to find the relationship.	
		Circles (assignment) Students measure circular objects and find p from the gradient of a graph.	
		Melting and Freezing Points (assignment) Illustrates how work from GNVQ Intermediate Science may be adapted for Making sense of data.	



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Interpreting graphs (6 hours)	Interpreting line graphs.	College Trip (skills activity) Includes a distance-time graph for interpretation.	Requirement 4 ($\frac{1}{2}$ hour) Brief descriptions of what two line graphs drawn by someone else tell you about the situations they represent.
		Crushed Calcium Carbonate (skills activity) Data and line graph of a chemical reaction for interpretation.	
		Curves (skills activity) Discussion sheets and exercise on interpreting and sketching line graphs. Focuses on the shape of graphs.	
Interpreting statistical charts (6 hours)	Interpreting pictograms, bar charts and pie charts.	Eclipse (skills activity) Data sheets about eclipses, discussion sheet and exercise involving interpretation of statistical diagrams.	Requirement 5 (1 hour) Brief report interpreting both raw data and at least two statistical diagrams produced by someone else.
		Mineral Water (assignment) Tabulated data and charts about the mineral content of various bottled waters. Students are asked to interpret and analyse this information.	
		Safety on the Roads (skills activity) Graphs and charts for interpretation.	
Revision (9 hours)		Making Sense of Data Revision Guide	

