



Narrative – Understanding graphs

Year group and curriculum area	Year 9 or 10. Science/biology/mathematics.
Activity	This activity is based on improving strategies to deal with drawing conclusions from data presented as a graph.
Topic	Health; diseases; charting death rates due to known causes over time.
Strategy/possible solution	<p>The aim is to understand how, by using a strategy, querying and processing information from graphs can be made easier and more reliable, evidence-based conclusions (with understanding) can be drawn.</p> <p>This can be done in stages.</p> <p>1. Learners are presented with the graph without values on the vertical scale and try to arrive at conclusions by just looking at the patterns in the graph and using their eyes and estimation. They make deductions across the data as well as within specific categories, e.g. the death rates from heart disease have fallen by more than half, or a better estimate, e.g. two thirds, etc. The idea is to derive a way of estimating the drop. This way learners get a 'feeling' for the data (at this stage) without a detailed numerical analysis.</p> <p>2. Now learners use the graph with values on the vertical scale. They read the values from the scale and either refine their conclusions and/or make further deductions/conclusions which support their original estimates.</p> <p>3. Learners process data from the graph, e.g. using percentages to refine conclusions or make further new conclusions.</p> <p>Requirements</p> <ul style="list-style-type: none">• Graph sheet without vertical values.• Graph sheet with vertical values.• Activity sheet 'Understanding graphs'.

	<p>There are several ways to approach this.</p> <p>Learners work in groups or as individuals. They are told nothing about the graph but are asked to make deductions and record how they went about coming to conclusions. They then evaluate their method.</p> <p>OR</p> <p>Learners are introduced to the question/problem using the activity sheet 'Understanding graphs' and work through each task, reporting on their findings and sharing them with the whole class as they are proceeding.</p>
Links with the LNF	<p>Skills</p> <ul style="list-style-type: none"> • Generating and using a strategy to solve problems. • Working collaboratively to solve a problem. <p>Numeracy component</p> <p>Strand: Developing numerical reasoning (Year 9/10)</p> <p>Element: Identify processes and connections (Year 9/10) Learners are able to:</p> <ul style="list-style-type: none"> • transfer mathematical skills across the curriculum in a variety of contexts and everyday situations • select, trial and evaluate a variety of possible approaches and break complex problems into a series of tasks • prioritise and organise the relevant steps needed to complete the task or reach a solution • choose an appropriate mental or written strategy and know when it is appropriate to use a calculator • identify what further information might be required and select what information is most appropriate • select appropriate mathematics and techniques to use. <p>Element: Represent and communicate (Year 9/10) Learners are able to:</p> <ul style="list-style-type: none"> • explain results and procedures precisely using appropriate mathematical language • refine methods of recording calculations • interpret graphs that describe real-life situations, including those used in the media, recognising that some graphs may be misleading. <p>Element: Review (Year 9/10) Learners are able to:</p> <ul style="list-style-type: none"> • interpret answers within the context of the problem and consider whether answers, including calculator, analogue and digital displays, are sensible

- interpret mathematical information; draw inferences from graphs, diagrams and data, including discussion on limitations of data
- draw conclusions from data and recognise that some conclusions may be misleading or uncertain.

Strand: Using number skills (Year 9)

Element: Fractions, decimals, percentages and ratio (Year 9)

Learners are able to:

- use equivalence of fractions, decimals and percentages to select the most appropriate for a calculation
- use and interpret different representations of fractions, *e.g. mixed numbers and improper fractions*
- express one quantity as a percentage of another
- calculate a percentage increase or decrease
- use ratio and proportion to calculate quantities.

Element: Calculate using mental and written methods (Year 9)

Learners are able to:

- use efficient written methods to add and subtract numbers and decimals of any size, including a mixture of large and small numbers with differing numbers of decimal places
- multiply and divide whole numbers and decimals.

Element: Estimate and check (Year 9)

Learners are able to:

- make and justify estimates and approximations of calculations
- choose the appropriate degree of accuracy to present answers.

Strand: Using data skills (Year 9)

Element: Collect and record data, Present and analyse data, Interpret results (Year 9)

Learners are able to:

- select and justify statistics most appropriate to the problem considering extreme values (outliers)
- examine results critically, select and justify choice of statistics recognising the limitations of any assumptions and their effect on the conclusions drawn.

	<p>Literacy component</p> <p>Strand: Oracy across the curriculum (Year 10)</p> <p>Element: Developing and presenting information and ideas (Year 10)</p> <p>Aspect: Speaking (Year 10) Learners are able to:</p> <ul style="list-style-type: none"> • present ideas and issues to meet the demands of different audiences • speak fluently, using a range of techniques, expressions and gestures • use formal language in a range of contexts • respond to how listeners react, and adapt their use of language for different contexts and purposes • sustain a convincing point of view, anticipating and responding to other perspectives, <i>e.g. in role or debate</i> • Welsh-medium statement: use a range of mutations correctly (soft, nasal and aspirate mutations) in context. <p>Aspect: Listening (Year 10) Learners are able to:</p> <ul style="list-style-type: none"> • respond to the ideas of others in thoughtful and considerate ways, seeking clarification through appropriate questioning • listen to a range of information and ideas from different viewpoints, identifying how different speakers present specific points of view. <p>Aspect: Collaboration and discussion (Year 10) Learners are able to:</p> <ul style="list-style-type: none"> • adapt talk in a range of roles, including in more formal situations, contexts and purposes, <i>e.g. speaking to larger audiences in a formal debate</i> • use a range of options and strategies to enable the group to progress and reach agreement. <p>Strand: Writing across the curriculum (Year 10)</p> <p>Element: Organising ideas and information (Year 10)</p> <p>Aspect: Meaning, purposes, readers (Year 10) Learners are able to:</p> <ul style="list-style-type: none"> • write both extended pieces, which include detailed evidence and information, and shorter pieces which summarise concisely, showing clear awareness of the reader or intended audience • construct responses that connect and develop ideas to fully cover the topic.
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	<p>Aspect: Structure and organisation (Year 10) Learners are able to:</p> <ul style="list-style-type: none"> • improve the content, structure and accuracy of their writing through independent review and editing • write independently in an appropriate form with increasing confidence, ensuring content is organised, detailed and relevant, <i>e.g. how best to present opinions, information and explanations</i> • organise writing in an appropriate form, ensuring content is detailed within and between paragraphs or sections. <p>Element: Writing accurately (Year 10)</p> <p>Aspect: Grammar, Punctuation, Spelling, Handwriting (Year 10) Learners are able to:</p> <ul style="list-style-type: none"> • vary sentence structures to engage and sustain the reader's interest and write with grammatical accuracy • use the full range of punctuation in order to vary pace, clarify meaning, avoid ambiguity and create deliberate effects • use a variety of strategies and resources to accurately spell an increasing range of familiar, unfamiliar and subject-specific words • present their handwritten or on-screen work effectively, choosing form, images and graphics to enhance meaning • Welsh-medium statement: write grammatically accurate sentences ensuring that the verb tense and person is correct in context • Welsh-medium statement: use a range of mutations correctly (soft, nasal and aspirate mutations) in context.
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