



## Unit 5B: Analysing data and asking questions: using complex searches

### About this Unit:

In this unit children learn to use prepared databases to answer questions which rely on more than one variable. They will present data in graphical form, print out their graphs and use them to help answer questions relating to the data.

Children will be able to build on what they have learnt in this unit when: investigating possible relationships between data in history, geography, science and mathematics; undertaking investigations that rely on more data than they are able to collect for themselves, for example when searching for information on the World Wide Web.

### Where this Unit fits in:

This unit builds on Unit 4D 'Collecting and presenting information: questionnaires and pie charts' and Unit 3C 'Introduction to databases'.

The unit assumes that children:

- know that data can be collected and represented in different formats, *e.g. tables, pictograms, bar charts, pie charts*
- understand that data needs to be sorted and organised so that information can be found easily
- know that data records consist of fields into which data is entered
- can sift, skim and read information.

### Vocabulary:

AND | OR

### Resources:

A variety of prepared databases including a database on birds | data-handling software that uses logical operators including 'AND' and 'OR' for searching data | Internet access (optional)

### Expectations: at the end of this unit,

*Most pupils will be able to:* use 'AND', 'OR', '=<' and '=>' in their searches.

*Some pupils will only be able to:* carry out searches using two or more criteria.

*Some pupils will also be able to:* carry out complex searches to check hypotheses.

*These units have been adapted from material available on the QCA Schemes of Work website*



<b>Learning Objectives</b> <i>Pupils should learn...</i>	<b>Possible Activities</b>	<b>Learning Outcomes</b> <i>Pupils can...</i>	<b>Consider</b>
<b>Setting the Scene</b>			
<ul style="list-style-type: none"> <li>• <b>key idea:</b> that databases can hold large amounts of information.</li> <li>• This information needs to be organised to enable searches to be carried out and information to be retrieved effectively.</li> </ul>	<ul style="list-style-type: none"> <li>• Show the children a prepared database, <i>e.g. properties of materials or planets in the solar system</i>. Ask them to look carefully at how the data is organised. Remind them of how to carry out simple searches using '=' and sorting on one field. Discuss questions which require other types of searches, <i>e.g. which planets have moons?</i></li> <li>• Discuss with the class the problems that might arise when searching a vast store of information such as the World Wide Web, and the need for focused searches.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify the fields used in the database.</li> <li>• Formulate questions based on the fields and information entered into the database</li> <li>• Understand the need for complex searches.</li> </ul>	<p>All activities in this unit provide opportunities to teach the use of moderated search engines on the Internet. If Internet access is available it is more likely to lead to surprising results because of its lack of structure. Comparisons can be made between searching a CD-ROM, the Internet and printed sources in terms of:</p> <ul style="list-style-type: none"> <li>• time taken;</li> <li>• amount of information found;</li> <li>• usefulness and reliability.</li> </ul>
<b>Short Focused Tasks</b>			
<ul style="list-style-type: none"> <li>• <b>technique:</b> to search a database using '&lt;=' and '&gt;='.</li> </ul>	<ul style="list-style-type: none"> <li>• Show the class how to use '&lt;=' and '&gt;=' in a search. Ask the children to work in groups to answer comparative questions.</li> </ul>	<ul style="list-style-type: none"> <li>• Use '&lt;=' and '&gt;=' in their searches.</li> </ul>	<ul style="list-style-type: none"> <li>• Questions will involve the use of language, <i>e.g. more than, less than, including</i>.</li> </ul>
<ul style="list-style-type: none"> <li>• <b>key idea:</b> that searches can be carried out using more than one criterion.</li> <li>• <b>technique:</b> to search a database using 'AND'.</li> </ul>	<ul style="list-style-type: none"> <li>• Show the class how to use 'AND' in a search. Ask the children to work in groups to convert questions into search criteria using 'AND'. Ask them to check their answers by searching on each criterion separately.</li> </ul>	<ul style="list-style-type: none"> <li>• Use 'AND' in their searches.</li> </ul>	<ul style="list-style-type: none"> <li>• Children often expect an 'AND' search to produce more results than an individual statement.</li> </ul>

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Learning Objectives <i>Pupils should learn...</i>	Possible Activities	Learning Outcomes <i>Pupils can...</i>	Consider
<b>Short Focused Tasks (Cont.)</b>			
<ul style="list-style-type: none"><li>• <b>technique:</b> to search a database using 'OR'.</li></ul>	<ul style="list-style-type: none"><li>• Show the class how to use 'OR' in a search. Ask the children to work in groups to convert questions into search criteria using 'OR'. Ask them to check their answers by searching on each criterion separately.</li></ul>	<ul style="list-style-type: none"><li>• Use 'OR' in their searches.</li></ul>	<ul style="list-style-type: none"><li>• Children often use 'OR' in an exclusive sense, rather than an inclusive sense.</li></ul>
<ul style="list-style-type: none"><li>• <b>key idea:</b> that information found is often unhelpful.</li><li>• <b>technique:</b> to skim read and sift information to modify a search strategy.</li></ul>	<ul style="list-style-type: none"><li>• Use an American CD-ROM encyclopaedia, or a moderated Internet search engine, to search for information on a topic such as 'football' which will locate a mixture of American and other information. Print out some of the material found and ask the class to skim read it to decide if it is useful. Discuss why the information is not what was expected. Discuss ways of modifying the search such as "football AND UK". Discuss with the class how the unstructured nature of the World Wide Web requires search strategies to be modified in the light of findings.</li></ul>	<ul style="list-style-type: none"><li>• Skim read information to check its relevance and modify their search strategies.</li><li>• Recognise that material held on IT systems comes from a variety of sources.</li></ul>	<ul style="list-style-type: none"><li>• More able children could be shown how to use 'NOT' in their searches, such as "football AND NOT USA".</li><li>• Not all search engines support the use of 'AND', 'OR' and 'NOT' searches.</li></ul>

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Learning Objectives Pupils should learn...	Possible Activities	Learning Outcomes <i>Pupils can...</i>	Consider
<b>Assessment Task</b>			
<ul style="list-style-type: none"><li>• to use complex searches to locate information.</li><li>• to use IT to test an hypothesis.</li></ul>	<ul style="list-style-type: none"><li>• As part of a science topic, introduce a prepared database on birds. Talk about the limitations of using printed graphs to spot relationships in data. Show the children how to use the facilities of the data-handling package to search the data using 'AND' and then 'OR'. For example they could be asked to find birds that are over 20cm long 'AND' lay more than five eggs, or to search for birds that are over 20cm long 'OR' lay a clutch of five eggs. The children should print graphs of their results and identify the differences between the two searches.</li><li>• Ask the children to search the data on birds to look for evidence to prove or disprove that the number of eggs laid by particular birds depends upon the size of the bird. Graphs should be produced as evidence to support their conclusions.</li></ul>	<ul style="list-style-type: none"><li>• Use 'AND' and 'OR' to search data when looking for relationships.</li><li>• Use '=&lt;' and '=&gt;' in their searches.</li><li>• Use graphs to provide supporting evidence for their conclusions.</li></ul>	<ul style="list-style-type: none"><li>• Children could use the techniques learnt to carry out independent enquiries on topics of interest.</li><li>• Children should be encouraged to question the data they find in a database. They could be asked whether information is factual, if it has been entered correctly or who compiled the data. They could verify their findings using other sources such as books or encyclopaedias or by searching the Internet using moderated search engines.</li><li>• Some children will need reminding about the consistent use of units.</li><li>• Some children will need support when searching for the data or when producing and printing their graphs. The amount of support will depend on the prepared database and how easily graphs can be produced in the software.</li></ul>

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