



Year 5 – Data and information – Flat-file databases

Unit introduction

This unit looks at how a flat-file database can be used to organise data in records. Learners will use tools within a database to order and answer questions about data. They will create graphs and charts from their data to help solve problems. They will also use a real-life database to answer a question, and present their work to others.

Software and Hardware requirements

You will need digital devices for learners to interact with during this unit, to access the free J2e data platform: <https://www.j2e.com/database/>. The website can be accessed via any device; laptop, Chromebook, desktop or tablet, and the example databases from the unit can be found here: <https://www.j2e.com/data/examples/>.

If you've adapted this unit to better suit your school, please [share your adapted resources](#) with fellow teachers in the STEM community. Alternatively, if this unit isn't quite right for your school, why not see if an adapted version which better suits has already been shared?

Overview of lessons

Lesson	Brief overview	Learning objectives
1. Creating a paper-based database	In this lesson, learners will create a paper version of a record card database. Using a card template, they will create a data set, with each learner creating eight to ten cards linked to a theme, e.g. animals. They will complete records for each of the animals in their database and then they will physically sort the cards to answer questions about the data.	To use a form to record information - I can create a database using cards - I can explain how information can be recorded

		I can order, sort, and group my data cards
2. Computer databases	In this lesson, learners will use a computer-based database to examine how data can be recorded and viewed. They will learn that a database consists of 'records', and that each record contains 'fields'. In addition, they will order records in different ways and compare this database to the paper database they created in Lesson 1.	To compare paper and computer-based databases - I can explain what a field and a record is in a database - I can navigate a flat-file database to compare different views of information - I can choose which field to sort data by to answer a given question
3. Using a database	In this lesson, learners will investigate how records can be grouped, using both the paper record cards created in Lesson 1 and a computer-based database from J2E. They will use 'grouping' and 'sorting' to answer questions about the data.	To outline how you can answer questions by grouping and then sorting data - I can explain that data can be grouped using chosen values - I can group information using a database - I can combine grouping and sorting to answer specific questions
4. Using search tools	In this lesson, learners will develop their search techniques to answer questions about the data. They will use advanced techniques to search for more than one field, and will practise doing this through both unplugged methods (without using computers), and using a computer database.	To explain that tools can be used to select specific data - I can choose which field and value are required to answer a given question - I can outline how 'AND' and 'OR' can be used to refine data selection - I can choose multiple criteria to

		answer a given question
5. Comparing data visually	In this lesson, learners will consider what makes a useful chart, and how charts can be used to compare data. They will create charts from their data in order to answer questions about it.	To explain that computer programs can be used to compare data visually • I can select an appropriate chart to visually compare data • I can refine a chart by selecting a particular filter • I can explain the benefits of using a computer to create charts
6. Databases in real life	The final lesson requires learners to use a real-life database to ask questions and find answers in the context of a flight search based on set parameters. They will take on the role of a travel agent and present their findings, showing how they arrived at their chosen options. Presentations may be given between groups of learners, or by each group to the whole class, depending on the time available.	To use a real-world database to answer questions • I can ask questions that will need more than one field to answer • I can refine a search in a real-world context • I can present my findings to a group

Subject knowledge and CPD opportunities

Teachers will need to know that a flat-file database is a collection of data organised in a single table. The term ‘database’ means ‘a collection of organised data that is stored on a computer’. Databases allow people to search and sort large quantities of data to find information. Data can be letters, words, numbers, dates, images, sounds, etc. In addition, teachers will need to be familiar with the basic structure of a database, and the concept of ‘grouping’ and ‘sorting’ data records based on different fields. For example, grouping objects by colour, or sorting into alphabetical order.

A database is composed of ‘records’, which are sets of data on a particular object. Records are formed from one or more ‘fields’ of data. A field is one specific piece of data in a database record. For example, a record all about a country could have fields such as ‘country name’ and ‘country population’. The

value within the record is the ‘answer’ to each field, e.g. Mexico is the value in the ‘country name’ field and ‘126.2 million’ is the value in the ‘country population’ field.

Teachers will also need to be aware that all objects have attributes. An attribute includes its ‘name’ and a ‘value’. For example, a ball will have a ‘colour’, which might be ‘red’. ‘Colour’ is the attribute ‘name’; ‘red’ is the attribute ‘value’. In a flat-file database the attribute names become the fields when the data about the object is stored as a record. The values of the attributes become the values that are saved in the database fields.

Teachers will need to be familiar with using J2Data sample databases. Support with navigating the databases can be found at <http://www.j2e.com/help/videos/datags4>. Knowledge of how to carry out a flight search using <https://www.expedia.co.uk/Flights>, and the ability to screenshot flight details from a web browser would also be beneficial.

Continual Professional Development

Enhance your subject knowledge to teach this unit through the following free CPD:

- [Getting started in Year 5 – short course](#)
- [Introduction to primary computing remote or face to face](#)

Teach primary computing certificate

To further enhance your subject knowledge, enrol on the [teach primary computing certificate](#). This will support you to develop your knowledge and skills in primary computing and gain the confidence to teach great lessons, all whilst earning a nationally recognised certificate!

Progression

This unit progresses learners’ knowledge and understanding of why and how information might be stored in a database and looks at how tools within a database can help us to answer questions about our data. It moves on to demonstrate how a database can help us display data visually, and how real-life databases can be used to help us solve problems. Finally, the learners create a presentation showing understanding and application of all the tools used within the unit.

Common Misconceptions

Learners may assume that data and information are the same thing. Data is raw unprocessed facts and figures without any context, typically a collection of letters, words, numbers, dates, images, etc. Information is data that has been processed, organised or structured to provide context and meaning- it helps to make sense of the data. For example, '1' is data, but '1' in a list of race positions is information as it tells us the person came first.

Learners may have the misconception of thinking that a flat-file database is just a simple list or table of data. In fact, a flat-file database is a single table that stores data in a structured format, allowing for efficient data organisation, retrieval or management. When looking at databases, learners may mistake records for fields, or vice versa. They should understand that fields are the specific categories of information (the columns in a table with headings for each category) and records are the complete set of information for each entry in the database (the row in a table, each representing a complete set of related information).

When searching a flat-file database, they may think that searching is the same as searching through a text file, however it can be far more efficient than manual searches using different search functions ('AND' and 'OR'). Again, learners may confuse these two search functions; simply, 'AND' will search for records that meet **all** the criteria, whereas 'OR' will search for records that meet **any** of the criteria.

Curriculum links

Computing

- Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- Select, use, and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems, and content that accomplish given goals, including collecting, analysing, evaluating, and presenting data and information

Maths – Statistics (Year 5)

- complete, read and interpret information in tables, including timetables.

Assessment

Formative assessment

Assessment opportunities are detailed in each lesson plan. The learning objectives and success criteria are introduced in the slide decks at the beginning of each lesson and then reviewed at the end. Learners are invited to assess how well they feel they have met the learning objective using thumbs up, thumbs sideways, or thumbs down.

Summative assessment

Please see the summative assessment document of multiple-choice questions for this unit. This can be downloaded as a paper copy, with answers, or in a digital format to be shared.

Resources are updated regularly — the latest version is available at: ncce.io/tcc.

Attribution statement

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The original version can be made available on request via info@teachcomputing.org.