# **Lesson 1: Database essentials**

## Introduction

This lesson gives your learners the key terminology required to be able to use SQL to search and update a relational database. It steps learners through the key concepts using a music database as an example, first as a flat file database and then as a relational database. Learners are then given their first experience with a Database Management System (DBMS) where they learn to navigate and investigate some of the tools that they offer.

## Learning objectives

* Describe a database
* Define database key terms (table, record, field, primary key, foreign key)
* Describe a flat file database
* Describe a relational database

## Key vocabulary

Database, field, record, primary key, foreign key, flat file database, relational database, relationship, data redundancy, data inconsistency

## Preparation

**Subject knowledge:**

For this lesson you will need to understand the key terms used with databases. You will also need to know how to use the DBMS software so that you can demonstrate opening a database and viewing records to your learners.

**Specialist software:**

This unit uses the DBMS called [SQLite Browser](https://ncce.io/ks4-sqlitebrowser) (ncce.io/ks4-sqlitebrowser). The version used for the lessons, including any screenshots, is Version 3.12.0. This has been selected because it is a widely used, free, open-source database management system. It allows you to view SQL code and also execute your own SQL code, making it user friendly for your learners. Install and test this software in your own setting before using it with your class.

**You will need:**

* Slides
* A0 Worksheet – How is data stored?
* A1 Worksheet – Database key terms quiz
* A1 Solutions – Database key terms quiz
* A2 Worksheet – Inefficient flat file database
* A3 Resource. You will need to download and unzip the file and place it in a location for your learners to access
* A3 Resource: Teacher demo
* A3 Worksheet – Explore a database
* A3 Solutions – Explore a database

## Assessment opportunities

Solutions sheets have been provided for each activity in this lesson. You can use this for peer/self/teacher assessment as required. It will also be helpful to use teacher questioning and discussion to ensure that learners are developing the required knowledge of the database key terms.

## Outline plan

Please note that the slide deck labels the activities in the top right-hand corner to help you navigate the lesson.

*\*Timings are rough guides*

| **Starter activity** (Slides 2–8)  10 mins | **How is data stored?**  Distribute the A0 worksheet to learners as they enter the classroom. The activity asks learners to search for information on two vehicles using the DVLA website.  The final part of the worksheet asks learners to think about how the data is stored and to think about how many vehicles the DVLA might have stored.  The purpose of this activity is to give learners experience of searching a large database and to tentatively introduce them to how data might be stored.  After giving learners a few minutes to complete the worksheet, use Slides 3–7 to discuss how the data is stored. The worksheet questions are provided on the slide along with some model answers to prompt discussion.  **Note:** on Slide 4, the value 37.9 million is the actual number of vehicles registered with the DVLA. It might be worth pointing this out to learners to show how large this collection of data must be.  Introduce the terms ‘database’, ‘record’, and ‘field’ to the learners using these slides. |
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| **Activity 1**  (Slides 9–16)  10 mins | **Database key terms**  Use the slides to introduce the main database key terms to your learners. The slides use the example of a music track database, which will be used throughout the next few lessons.  A quiz has been provided to check that learners have understood the key terms (Slide 16). This can be marked using an online system or through self/peer assessment. This will allow you to quickly check that learners have grasped those key terms.  **Note:** ‘Foreign key’ has been left out of the key terms here as we are just looking at a flat file database. The term foreign key will be introduced in the next activity. |
| **Activity 2** (Slides 17–43)  10 mins | **Relational databases**  Start by showing learners the inefficient flat file database (Slide 17). Ask them to take a look at it and highlight any potential issues that might arise from storing the data in this way. A worksheet has been provided for them to do this (Slide 18).  Then ask learners for their thoughts before using Slides 19–22 to highlight the potential issues.  Introduce the concept of a relational database using Slides 23–28, and use Slides 29–43 to demonstrate how this can help solve the problem on the flat file database. |
| **Activity 3**  (Slides 44–46)  20 mins | **Using a database management system (DBMS)**  Introduce DB Browser for SQLite to your learners. This is the DBMS that they will be using for this unit. This is a powerful, open source DBMS that allows you to navigate and update a database in a user-friendly way. It also has the ability to use SQL commands using SQLite. It is important to note that it is not a visual shell for the sqlite command line tool. However, all files are compatible with SQLite.  Spend some time showing learners how to open the database project file dbMusic.db and navigate the three tables of data held within it. Make it very clear to learners that they need to ensure that they use a copy of the database and not the file in the shared area.  A teacher demonstration video for this is available and can be viewed prior to the lesson to support you with this activity.  After demonstrating the software to your learners, ask them to complete the Activity 3 worksheet where they will explore the data in the database.  **Note:** Make sure that you add the location of the file in your shared area to the worksheet. |
| **Plenary**  (Slides 47–50)  5 mins | **What other data has been repeated?**  Ask learners to look again at the database and decide whether there are any other cases where data has been repeated. Hopefully they will spot that the Genre and Artists are repeated in the tracks table.  Also ask, how could this be avoided? Hopefully they will suggest that further tables could be made for those pieces of data. |
| **Homework** | **N/A** |

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