

INSPIRE **COMPUTING**

International

Student Book **YEAR 6**

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Series editor: Paul Clowrey



Pearson

Published by Pearson Education Limited, 80 Strand, London, WC2R 0RL.
www.pearson.com/international-schools

Copies of official specifications for all Pearson Edexcel qualifications may be found on the website:
<https://qualifications.pearson.com>

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Designed and typeset by PDQ
Picture research by Integra
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First published 2023

25 24 23
10 9 8 7 6 5 4 3 2 1

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN 978 1 292 40426 4

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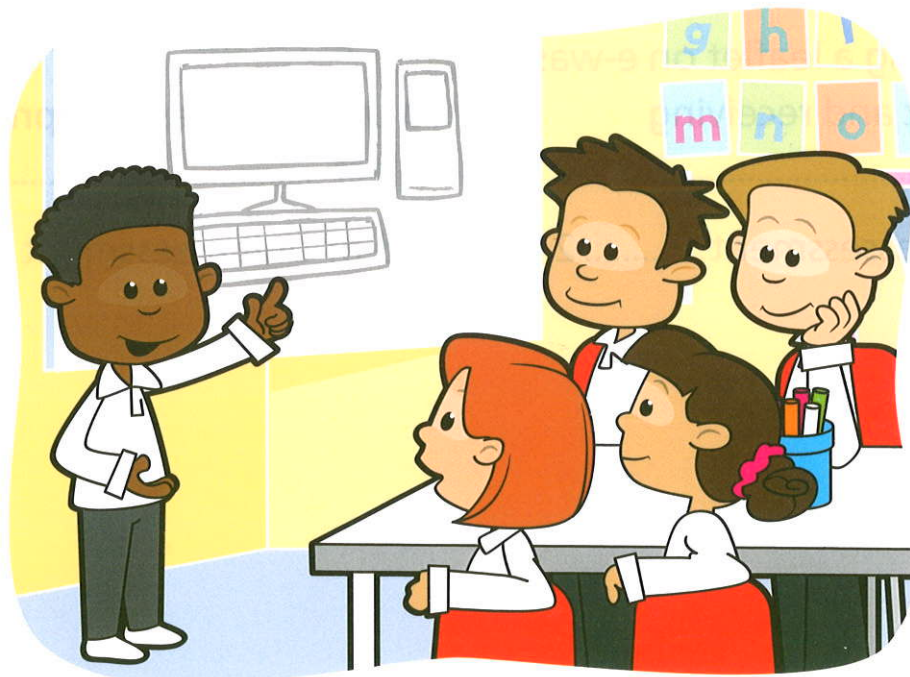
Glossary

Welcome to Inspire Computing

We are all living in a continually evolving digital world. By supporting learners in becoming confident and knowledgeable users of technology we can ensure you are prepared for the future.

Inspire Computing makes important topics accessible for all learners. You will understand how to stay safe online while still enjoying the freedom to explore the World Wide Web. You will delve deeper into understanding algorithms through creative approaches, exploring networks and systems, and create and film exciting animation projects!

Each topic includes easy to understand theory, real-world examples, and ideas for further investigation. You will also have the chance to show off your knowledge and understanding through supportive assessments and student checkpoints!



Key objectives

What you will know or be able to do by the end of the unit.

Unit 1

Online safety

In this unit you will learn about the form of inappropriate online behaviour known as cyberbullying. You will learn ways to identify it and discuss what to do if it happens to you or your friends.

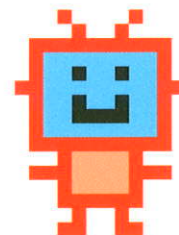
Then you will practise your learning by planning, scripting and recording a green screen video. You will use cropping and merging skills to edit your video.

Key objectives

- 🎯 To understand the risks and dangers of sharing personal information online, and to know what information you should never share online.
- 🎯 To understand the differences between bullying and cyberbullying.
- 🎯 To be able to recognise cyberbullying, how it affects its victims, and what to do if you experience it yourself or witness it happening to someone else.
- 🎯 To be able to create a green screen video from scratch, including writing the script, recording and editing.

Introduction

Here you can find out what this unit will be all about.



In this lesson you will:

This is what you will know or be able to do by the end of the lesson.



Key vocabulary

Important words to know.

Starter

An introduction to the activity or information to start a discussion.

Lesson 9

Using a search engine efficiently



In this lesson you will use your skills to effectively use a search engine and collect your information.



Key words: paraphrase, plagiarism



Review your work from Lesson 8. Explain to your partner what you are going to research, how you are going to use a search engine and how you are going to present your research.

Now you can start your project by researching and saving the information you find. Remember to follow your school policy for online safety and make sure you know what you should do if you need help.

Remember to **paraphrase** (rephrase and rewrite) the information you find so you are not taking credit for other people's work. Pretending that someone else's work is your own and taking credit for it is called **plagiarism**.



Activity 1

Research your project using your planning. Record the information you find in a table.

Look out for these boxes for extra information and for key reminders.

- If the part you want to trim is in the middle of the clip (for example, a mistake) you will need to split the clip after the mistake. To do this, select the clip that contains the mistake and drag the red box to the beginning of the mistake. This will cut out the mistake.
- You will then need to **merge** the first and second parts of the clip as already described.

Pay attention to the location of the red line that shows the **timeline** when you import, crop, trim and edit your video. Swipe left and right to move your timeline along.



Activity 3

Edit any mistakes out of your video files on your device. Make sure you have merged the remaining video clips together.



Watch your finished video with a partner and discuss if you think you have cropped and edited the film well. Why or why not? What could you have done better?



I can use appropriate software or online services to meet the specified needs of a project.



I can import video files.



I can edit and merge video files.

Activity

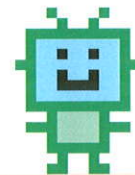
You may need to write or draw an answer. You may create a game or work with Scratch. You may work with a partner or on your own.

Refresher

To make sure that learning is secure.

Key vocabulary

Some tricky words are in **bold**. Find out what these mean in the Glossary at the back of the book.



Checklist






A handy list with the key parts of this lesson.

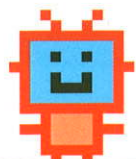
Unit 1

Databases

In this unit you will use simple database methods, structures and types. You will develop your skills with using databases and software to collect, present and evaluate data. You will learn some of the differences between a spreadsheet and a database, and the reasons why databases are used in schools and businesses. Finally, you will use advanced search methods to gather information from large databases online and present your solutions to a problem.

Key objectives

-  To understand the key features of a database management system (DBMS).
-  To understand different data types including alphanumeric/text, numeric/number and date.
-  To understand the structure of a given database, including record, field and table.
-  To use search/query, using a single criterion.
-  To select, use and combine appropriate software applications to design and create a range of content that accomplishes given goals.



Lesson 1

Looking at ways to store information



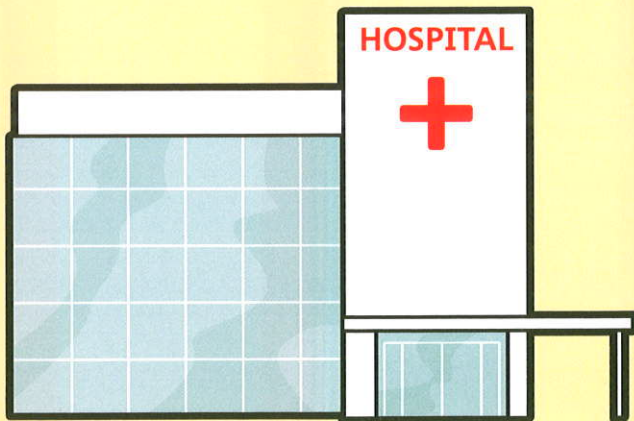
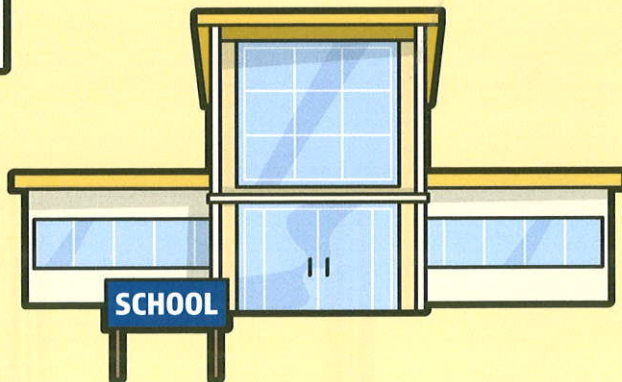
In this lesson you will learn about the main features of a database by looking at some examples.



Key words: data, database, database management systems (DBMS), field, information, record



With a partner, discuss the types of information that would be saved and used in the following places.



A **database** is information, or **data**, which is stored in a computer. **Information** is stored as **records**. Each record will have different **fields** where the data will be entered. Databases gather information in one place so that it can be ordered, filtered and analysed.

Think about your school database. All the student information needs to be stored, so in a school database the children are the records. In a library, the books it holds will be the main database, as well as the membership information for who has taken which book.

Here is a sample class database:

Student ID	Surname	First name	Gender	Form tutor	House	Date of birth	Bus number
109877	Chung	Conrad	M	Roberts	Jupiter	01/10/2014	18A
109901	Fischer	Heidi	F	Riemann	Jupiter	15/11/2014	18A
109945	Freund	Linda	F	Chapman	Mars	12/07/2015	7
109948	Gallia	Harriet	F	Chapman	Juno	22/02/2015	7
109967	Imran	Maria	F	Kapra	Jupiter	05/04/2015	13A
109984	Jacobs	Leonard	M	Riemann	Mars	15/12/2014	11
110013	Novas	José	M	Chapman	Mars	05/03/2015	18A
110056	Renaud	Olivia	F	Kapra	Juno	09/06/2015	7

In this example of your class database:

- a record is one student and all the information linked to them
- a field is a part of the information on the record, like surname, gender, form tutor, etc.
- the database is the whole collection of records of the class.



Activity 1

With your partner, think of five fields for this animal. The first one has been done for you.



Field 1

Length of neck

As technology has evolved and computers have become more common, there are more advantages to using computer-based records. There are several drawbacks to keeping hard copy data (data printed on paper). Printed material can be damaged or lost, and it can be hard or impossible to extract useful information from them. Computer databases are relatively easy to use and can be searched more easily.

Database management systems (DBMS) are a type of software that are used to create, search and store data.



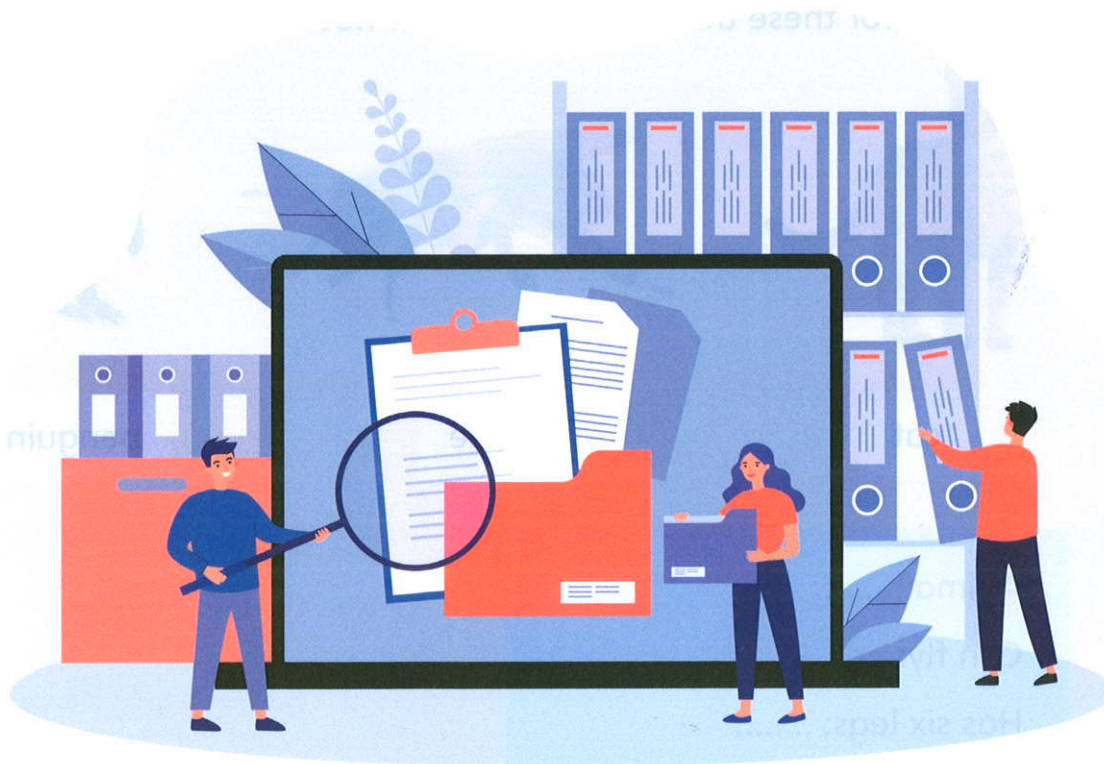
- a) Tell a partner three things that you learned about databases and why they might be useful.
- b) Discuss with your partner what kind of data you think would be included in a dentist's database.



I understand what the key features of a database are.



I understand the structure of a database, such as records, fields and tables.





Lesson 2

Creating a data table and running basic queries



In this lesson you will create a data table and learn how to filter and sort data to search for information.



Key words: cell, collate, filter, format, query, record, search, sort, spreadsheet, table



a) Work with a partner to complete the following fields for the databases for these three animals in your notebook.



cat



bee



penguin

Animal:

Can fly:

Has six legs:

Lives in large groups:

Lives on land

b) Choose your own animal and complete the fields for it.

Database software allows you to **sort** and **search records** easily and quickly, and then to present the data in a useful format. Databases usually present their information in the form of **tables**. These help you to organise records and spot patterns in the data.

In this lesson you will move the information from your paper-based tables to your device. You will then practise finding records and information as part of basic queries. A database **query** is the term used to describe the information you want the database to find.

For example, look at the information in the class database in Lesson 1. If you want to find only the female students in Juno house who take the number 7 bus, you can **filter** the information that meets the query. You can organise the results in a variety of ways to help you to understand or use the information.

A filter will only show the parts of the table that you have selected, and will hide the other parts.

The data from your paper records will need to be inputted into your computer. This store of information will be our database. We do not need any special applications to do this task as this is a simple example of a database. A good program to use would be a **spreadsheet**, such as Microsoft Excel®, Apache OpenOffice Calc® or Apple Numbers®.

To input the data on your devices, it is sometimes helpful to **collate** the data before you start typing each record. If you collate the data, you will not need to have all the individual records in front of you as you input the data. To collate the records, we will combine the information onto a new sheet which will show all the data at the same time.



Activity 1

Discuss the following questions by using the information in the table below.

Animal	Can fly?	Has six legs?	Lives in large groups?	Lives on land?
bat	yes	no	yes	yes
bee	yes	yes	yes	yes
dolphin	no	no	yes	no
rabbit	no	no	yes	yes
turtle	no	no	no	no
cat	no	no	no	yes
penguin	no	no	yes	yes
rhino	no	no	yes	yes
shark	no	no	no	no

- How many animals have six legs?
- Which animals live on land and in large groups?
- Which animal meets all the filters in the query?
- Can you think of any more animals that meet all the filters in the query?



Activity 2

Now that you have your paper table with all the collated information for the animals, input this into a spreadsheet on your device. This will be your simple database.

Use the table function from the tool bar to rearrange the data more easily to answer simple queries. You should be able to see the menu arrow in the **cell** – this means that you have activated the table function. If you do not do this, when you sort the columns the rest of the table will stay as it is, only the column you’ve selected will be sorted and the data then becomes mixed up.

The table below has been tidied up so that the fonts are clearer and the size of the columns and rows are appropriate. However, this is not yet a formatted table where we can use the sort function.

	A	B	C	D	E	F
1	Animal	Can fly?	Has six legs?	Lives in large groups?	Lives on land?	
2	bat	yes	no	yes	yes	
3	bee	yes	yes	yes	yes	
4	dolphin	no	no	yes	no	
5	rabbit	no	no	yes	yes	
6	turtle	no	no	no	no	
7	cat	no	no	no	yes	
8	penguin	no	no	yes	yes	
9	rhino	no	no	yes	yes	
10	shark	no	no	no	no	
11						

To **format** it as a table, we need to select the table and then click ‘Format as Table’ from the toolbar.

The screenshot shows the Excel interface with the 'Format As Table' dialog box open. The table data is selected, and the dialog box is asking for the table range and whether it has headers. The range '\$A\$1:\$E\$10' is entered, and the 'My table has headers' checkbox is checked.

Now you will be able to sort the records by right-clicking the arrow at the top of the table and selecting your options.

	A	B	C	D	E	F	G
1	Animal	Can fly?	Has six legs?	Lives in large groups?	Lives on land?		
2	bat	yes	no	yes			
3	bee	yes	yes	yes			
4	dolphin	no	no	yes			
5	rabbit	no	no	yes			
6	turtle	no	no	no			
7	cat	no	no	no			
8	penguin	no	no	yes			
9	rhino	no	no	yes			
10	shark	no	no	no			
11							
12							
13							
14							
15							
16							
17							
18							
19							

Lives in large groups?

Sort

A-Z Ascending Z-A Descending

By colour: None

Filter

By colour: None

Choose One

Q Search

(Select All)

no

yes

Auto Apply

Apply Filter Clear Filter

You can sort the table alphabetically so that the same data is grouped together, which will make the records easier to see and count. For example, to answer the question, 'How many animals live in large groups?', sort the 'Lives in large groups?' column from A–Z so that the yes and no answers are grouped together. This makes the question easier to answer.

	A	B	C	D	E
1	Animal	Can fly?	Has six legs?	Lives in large groups?	Lives on land?
2	turtle	no	no	no	no
3	cat	no	no	no	yes
4	shark	no	no	no	no
5	bat	yes	no	yes	yes
6	bee	yes	yes	yes	yes
7	dolphin	no	no	yes	no
8	rabbit	no	no	yes	yes
9	penguin	no	no	yes	yes
10	rhino	no	no	yes	yes
11					

We can see that this table has been sorted because an arrow has appeared in the menu button. To answer our example, bats, bees, dolphins, rabbits, penguins and rhinos live in large groups.



Activity 3

a) Try running simple queries on your device. Can you find the answers to the following queries using the filter and sort functions?

- Identify the animals that live on land.
- Identify the animals that don't live in large groups.
- Identify the animals that live on land and can fly.

b) Carry out any more searches that you can think of.



Discuss with a partner:

- How does a table help you to find information?
- How could it be improved?
- Without recording information in a table, how would you search for the information?



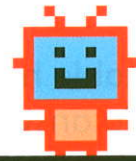
I can create a database.



I know how to use the filter and sort functions database to find information.



I can run simple queries.



Lesson 3

Using spreadsheet software to work with a single table database



In this lesson you will work on a database and learn how to create database queries.



Key words: alphanumeric, column, criterion, filter, format, query, unformatted



What is a database? Discuss with a partner and pick three answers.

A database:

A retrieves its data from the internet

B is stored on a computer

C is a collection of tables that contain data

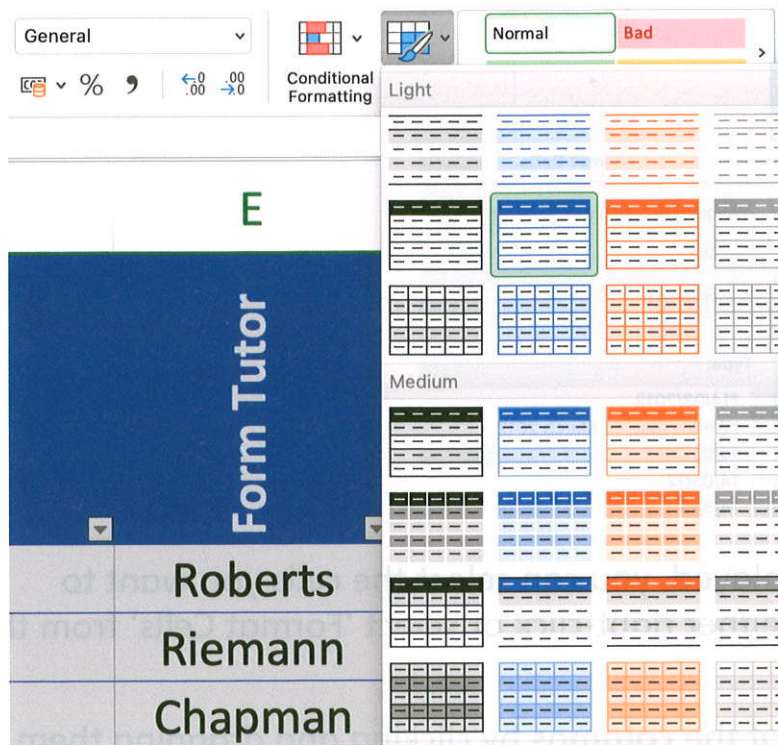
D can be used to search and sort a dataset

E is a collection of organised data.

To be able to run queries on data entered in spreadsheet software, the data needs to be formatted. In an **unformatted** table, only the data has been added.

To **format** a table in a spreadsheet, you can do the following (note: while this has been shown in Microsoft Excel, most spreadsheet applications will have the same features and similar icons).

Use the 'Format as Table' button and select a table design of your choice from the tool bar.



You can edit the look of the table so that it is easier to read. To do this, use the different fonts, sizes, colours, borders, bold and alignment features.

This table shows the different data types for each of the fields from the class database from Lesson 1:

Data type	Table fields	Example
text	Surname, First name, Gender, Form tutor, House	Chung, Jupiter
number	Student ID	109901
alphanumeric	Bus number	18A (a mix of letters and numbers)
date	Date of birth	01/10/2014

Date of birth	Bus number
01/10/2014	
15/11/2014	
12/07/2015	
22/02/2015	
05/04/2015	
15/12/2014	

To change how the data is displayed, you can select the cells you want to change the data type for and either right-click or select 'Format Cells' from the menu.

Change the height and width of the **columns** by clicking and dragging them to the size that you feel is appropriate.



Activity 1

If you have an unformatted table, what ways can you change how it looks to make it easier to read?

Discuss with a partner or group.

Now that the table has been formatted, we can start analysing the data by using the sort function, as we did in Lesson 2.

Another technique to search for information is to use a **filter**. A filter will show only the parts of the table that you have selected, and will hide the rest. This is very useful if you have more than one **query** that you want to find. Using the sort function on a table is easy to do with one **criterion**, but when you have two or more, the table can't sort two different columns at the same time. Using filters allows you to select the criteria you want and then you can use the sort function afterwards if necessary.

Here is an example of how to use a filter. You need to click the column menu you want to filter and then select the options you want to see. In this example, only those using the number 7 bus have been selected.

The screenshot shows a data table with a column menu for 'Bus number'. The table has three rows, all containing the value '7'. The column menu is open, showing sorting and filtering options. The filter is set to 'Equals' with the value '7'. The filter options are: (Select All), 7 (checked), 11, 13A, and 18A.

Bus number
7
7
7

Sort

A ↓ Ascending Z ↓ Descending

By colour: None

Filter

By colour: None

Equals 7

And Or

Choose One

Search

- (Select All)
- 7
- 11
- 13A
- 18A

You can tell if a filter has been applied to a column by looking at the menu button. If there is a symbol that looks like a filter, then one has been applied.



A more complex filter is to set two or more criteria, like Mars and Juno house.

The screenshot shows a web application interface for a 'House' list. On the left, a blue sidebar contains the title 'House' and a list of house names: Mars, Juno, Mars, Mars, and Juno. On the right, a filter panel is open. The 'Sort' section has 'Ascending' selected. The 'Filter' section has 'By colour: None', 'Equals Juno', 'Or', 'Equals Mars', and a search bar. A dropdown menu is open showing '(Select All)', 'Juno', 'Jupiter', and 'Mars'.

Conditional filtering using operators allows only results to be shown that meet a certain criteria. For example, the 'Date of birth' field has been filtered to only show those born before January 1st 2015.

The screenshot shows a web application interface for a 'Date of birth' list. On the left, a blue sidebar contains the title 'Date of birth' and a list of dates: 01/10/2014, 15/11/2014, and 15/12/2014. On the right, a filter panel is open. The 'Sort' section has 'Ascending' selected. The 'Filter' section has 'By colour: None', 'Before 01/01/2015', 'And', and 'Choose One'. A dropdown menu is open showing '(Select All)', '> 2015', and '> 2014'.



Activity 2

What kind of queries could you filter about the data that has been collected?

Work with a partner to think of three queries for the data you have collected. An example is shown below.

Write down the names of any female student that travels on the number 7 bus.



Discuss with your partner how the information would have been sorted if there were only paper databases.

- How would it have worked if there were 100 records? Or 1000 records?
- What are the advantages of using a computer-based database system?



I can format a database.



I can use the filter function to answer more complex search queries.