

Unit 1.6: We are detectives



Using data to solve clues

Software: Popplet, Google Forms, Google Sheets (alternatives: FreeMind, Bubbl.us, MindMeister, Microsoft Forms, Microsoft Excel)

Hardware: iPads (alternatives: laptop/desktop computers, Chromebooks or Android tablets)

Overview

In this unit, pupils work with a set of data on pirates. In:

- **Session 1** they explore the **dataset** as printed cards
- **Session 2** they explore the dataset as virtual cards in Popplet
- **Session 3** they organise data into a **tree**, using questions to create subgroups
- **Session 4** they input data from the cards to an online form
- **Session 5** they create **filters** on a spreadsheet to identify subsets of the data
- **Session 6** they use the spreadsheet to solve clues about the pirates.

Alternatives

The unit sessions give step-by-step guidance on using Popplet, Google Forms and Google Sheets. However, the Popplet activities could be carried out using other mind-mapping software, such as FreeMind, Bubbl.us or MindMeister. Instead of Google Forms and Google Sheets, you could use Microsoft Forms and Microsoft Excel.

Knowledge, skills and concepts

In this unit, pupils will learn:

- how data can be structured as **records** with **fields** for information
- how data can be organised into groups and subgroups
- how data can be structured as a **tree**
- how data can be organised into a **table**
- how data in a table can be filtered and searched.

Progression

In Key Stage 1:

- Pupils will build on their skills of collecting and presenting data in **Unit 2.6: We are zoologists**.

In Key Stage 2:

- Pupils will develop their skills of collecting, organising and displaying data in **Unit 3.6: We are opinion pollsters**.

Assessment – by the end of the unit:

All pupils can:

- identify groups of **records** that meet criteria
- ask questions about the records to identify groups and individuals
- organise real and virtual cards into groups
- follow questions in a **tree** to identify individuals
- enter data using a form
- apply **filters** to a **table**.

Most pupils can:

- ask questions efficiently to identify groups and individuals
- organise records into groups and subgroups
- create a tree to organise data
- understand the relationship between entering data in a **form** and a table of records with **fields**

- apply multiple filters to a table
- use filters on a table to solve clues.

Some pupils can:

- understand that efficient questions split the dataset into roughly equal groups
- create an efficient (roughly symmetric) tree to organise data
- explain the terms ‘table’, ‘record’ and ‘field’
- sort data into order based on values in a given field
- understand how **databases** can contain personal information
- give examples of databases used in and beyond school.

Background information

- Managing large collections of data is an important application of computers. Today, there is increasing use of 'big data', and concerns over the implications for personal privacy of the extensive use of personal data by government and other organisations.
- This unit focuses on a **dataset** that can be represented as a single **table**. Each row represents a separate **record** (here, an individual pirate) and each column represents a particular piece of information about the pirates (their name, gender, age, height, etc.).
- Operations can be performed on this data, such as **filtering** it to produce a subset of the data, **sorting** it into order or searching for a particular record.
- The same data can be structured or represented as a **tree**, with questions at each branch point to divide the dataset into categories and sub-categories, until a sequence of questions leads to just a single record at the tree's **leaves**.

Key vocabulary

Database: a structured collection of data organised so that groups of records can be identified

Dataset: a set of data from a group related to a particular topic

Field: information in a database related to a single type of information given for all the records, such as age

Filter: to identify a subset of data based on one or more criteria

Form: a way of entering a record and sometimes viewing a database record

Leaf: the end points of a tree data structure, where no further questions are asked

Record: information in a database related to one individual or case

Sort: to rearrange the order of records in a database based on the values in the fields

Table: a data structure representing records as rows and fields as columns

Tree: a data structure represented as an upturned tree, using questions at branch points to separate data into categories until one item is left at each leaf

Differentiation

See each session (pages 63–68) for additional ways to increase support and add challenge to this unit.

There are opportunities to challenge higher attaining pupils by exploring the idea of efficient questions (ones which split the **dataset** into roughly equal parts), and of sorting data based on the values of given **fields** such as age, height or name.

The tasks here become more accessible for lower attaining pupils if the size of the dataset is reduced. If pupils struggle to use the spreadsheet interface for **filtering tables** they can answer the same questions and solve the clues using Popplet or the printed cards.

Cross-curricular opportunities

English: This unit can be linked to pirate stories and adapted to use data about characters in books that pupils are reading.

Maths: Thinking about **tables** of data is important in mathematics. Some pupils will sort the **dataset** using measurements and ages.

History: Pupils could learn about piracy in the past.

Geography: Pupils could learn about places where piracy was common. The unit could be adapted to link to use a dataset based on countries, cities or rivers.

Science: The tree data structure here forms the basis for classification keys in science. The unit could be adapted to use a dataset based on animals or plants.

PSHE: Pupils should think about the different organisations that collect, store and process data about them and the privacy issues raised by this.

Preparation for teaching the unit



Things to do

- Check you have access to Popplet on the iPad, Google Forms and Google Sheets.
- Read pages 60–61 to get an overview of the unit.
- Read the steps in the unit sessions (pages 63–68) and look at the associated online resources, printing out the worksheets as required.
- Work through the unit yourself so you know what is expected of pupils.
- Create a pirate popplet following the 'Pirate data popplet instructions' (See *Session resources*).
- Make sure pupils can access the pirate data popplet from Popplet on their iPads.
- Make your own copies of the Google Form and Sheet and ensure pupils have access.



Resources needed

- **Software:** Popplet, Google Forms, Google Sheets
- **Hardware:** iPads
- See *Alternatives* on page 60



Online resources provided

Session resources

- Worksheet 1.6a: Pirate data cards
- Worksheet 1.6b: Pirate data questions 1
- Worksheet 1.6c: Pirate data questions 2
- Worksheet 1.6d: End-of-unit quiz
- Worksheet 1.6e: Pupil self-assessment
- Teaching slides 1.6a–1.6f
- Walkthrough videos 1.6a–1.6e
- Interactive end-of-unit quiz 1.6
- Pirate data popplet instructions
- Pirate data form
- Pirate data spreadsheet

Additional resources

- CPD video: Working with databases



Online safety

- The unit introduces pupils to the idea of **databases** being used to collect, store, process and retrieve personal information. The unit provides an opportunity to make pupils aware that they have their data held in databases used by the school and to discuss some of the issues raised by this.
- While many pupils would be interested to see the data held about them by the school, a breach of GDPR would occur if pupils saw other pupils' data.
- Discuss the dangers of giving personal information on online forms, particularly if we have no clear idea of where this data is held and to what purposes it might be put. Emphasise that they should only ever complete forms asking for personal information with their parents' or carers' permission.
- Google Sheets has an online discussion tool that pupils can use to exchange messages. This can be disabled by your G Suite administrator.



Collaboration

- The planning here is based on small groups of pupils working collaboratively to organise the data, answer questions and solve clues.
- In Session 4, the class work collaboratively to enter the data from the pirate data cards into an online **form** to populate a spreadsheet **table**.



Useful links

Software and tools

- Popplet: www.popplet.com
- Google Forms: www.google.co.uk/forms/about
- Google Sheets: www.google.co.uk/sheets/about

Online tutorials

- Popplet: www.blog.popplet.com/tutorial-getting-started-all-about-popples
- Google Forms: www.support.google.com/docs/answer/6281888?co=GENIE.Platform%3DiOS&hl=en
- Google Sheets: www.support.google.com/docs/answer/6000292?co=GENIE.Platform%3DiOS&hl=en&oco=1

Information and ideas

- Popplet ideas for the classroom: www.blog.popplet.com/10-great-popplet-ideas-for-the-classroom
- Google Forms in the classroom: www.weareteachers.com/google-forms-for-the-classroom
- 20q.net: www.20q.net
- Teaching databases: www.teachingideas.co.uk/subjects/databases

Unit outcomes

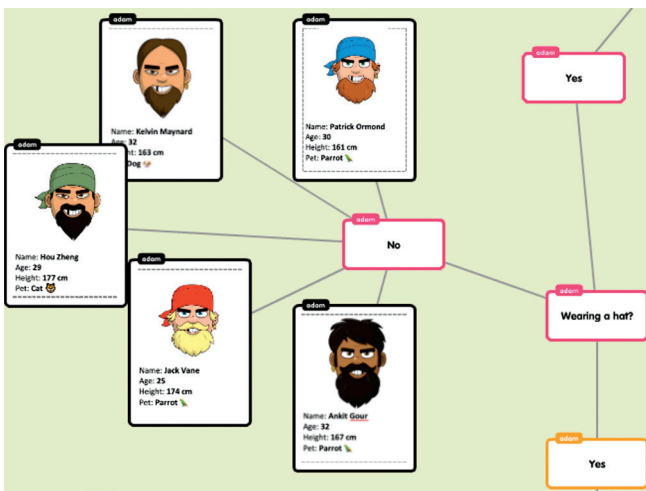
Below are some examples of the outcomes you could expect from this unit.



Session 1: Playing 'name the pirate'



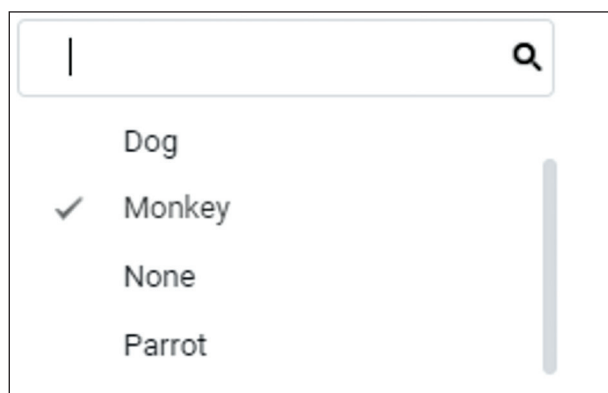
Session 2: Using Popplet to organise a dataset



Session 3: Organising the data into a tree in Popplet

	A	B	C	D	E	F
1	First name	Last name	Age	Height (cm)	Gender	Pet
2	Jack	Vane	25	174	Male	Parrot
3	Ted	Teach	23	180	Male	None
4	Patrick	Ormond	30	161	Male	Parrot
5	Edward	Pugwash	28	170	Male	Parrot
6	Charles	Kidd	33	157	Male	Dog
7	Lee	Roberts	28	181	Male	Monkey
8	Isaac	Drake	25	158	Male	None

Sessions 4 and 5: Creating a tidy table of pirate data which can be filtered



	A	B	C	D	E	F
1	First name	Last name	Age	Height	Gender	Pet
7	Lee	Roberts	28	181	Male	Monkey
13	Yen	Wong	21	172	Male	Monkey
26	Rachel	Nguyen	42	158	Female	Monkey
31	Zafirah	Rassi	21	159	Female	Monkey

Session 6: Applying filters to a database