

Useful links:

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 [Instant classroom](#)

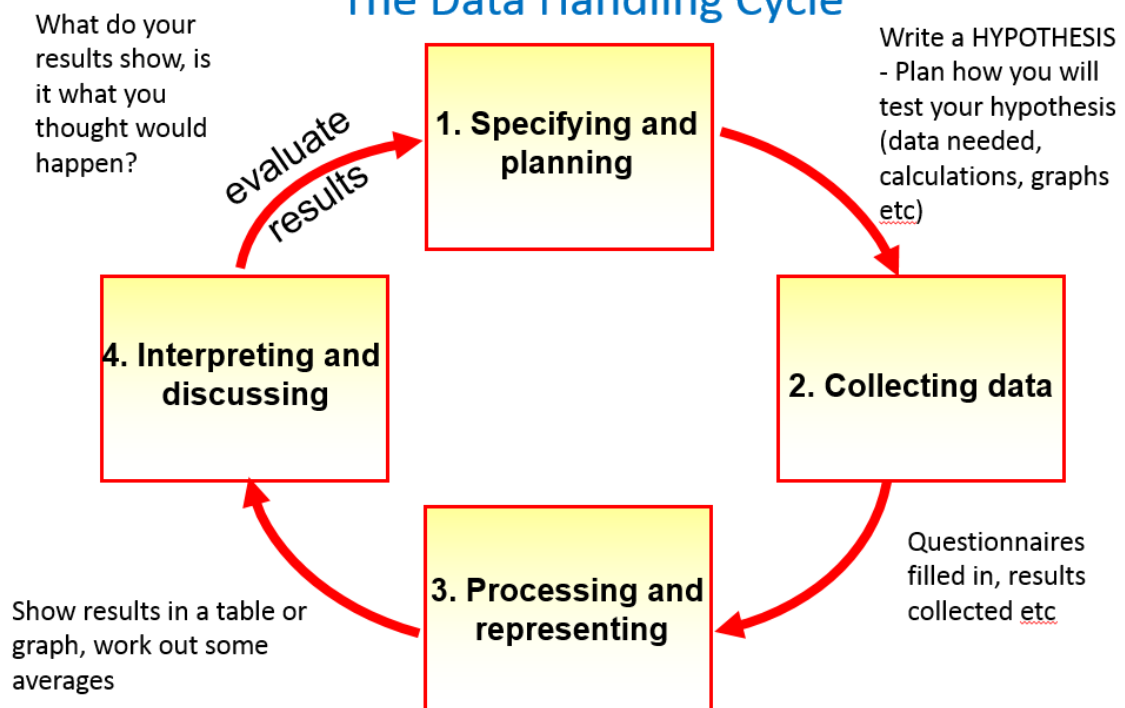
 [MyMaths](#)

[Objectives](#)

Objectives

To understand how to collect data
- data collection sheets, questionnaires, hypothesis etc

The Data Handling Cycle



Objectives

To understand how to collect data
- data collection sheets, questionnaires, hypothesis etc

Collecting Data

Read this carefully - what do the words in **RED** mean????



My **HYPOTHESIS** is that Sidcot pupils have healthy diets and do plenty of exercise!



I need to collect some **PRIMARY DATA** from the **POPULATION** and to do this I will design a **QUESTIONNAIRE**.

My **QUESTIONNAIRE** must not have any **LEADING QUESTIONS** and must have some clear and simple **CLOSED QUESTIONS** with **TICK BOXES**

Because my **POPULATION** is so large I will give my questionnaire to a **SAMPLE** of pupils. I must choose my sample carefully so that it is **REPRESENTATIVE** and I avoid **BIAS** in the results

Words, words, words!
(match them up)

LEADING QUESTION

suggests the answer that you want them to say

PRIMARY DATA

data collected for a particular purpose

HYPOTHESIS

a statement that may or may not be true

CLOSED QUESTION

a question followed by a selection of answer boxes

BIASED

unfair, unreliable

A CENSUS

when the whole population is surveyed

SAMPLE

part of the population

OPEN QUESTION

a question that might produce a long answer that is difficult to process

POPULATION

the whole group under investigation

REPRESENTATIVE

fair; has the characteristics of the whole population

SECONDARY DATA

data collected by someone else for a different purpose

THE CENSUS

a special census carried out in the UK every 10 years

Words, words, words!

HYPOTHESIS a statement that may or may not be true

POPULATION the whole group under investigation

A CENSUS when the whole population is surveyed

THE CENSUS a special census carried out in the UK every 10 years

PRIMARY DATA data collected for a particular purpose

SECONDARY DATA data collected by someone else for a different purpose

OPEN QUESTION a question that might produce a long answer that is difficult to process

CLOSED QUESTION a question followed by a selection of answer boxes

LEADING QUESTION suggests the answer that you want them to say

SAMPLE part of the population

REPRESENTATIVE fair; has the characteristics of the whole population

BIASED unfair, unreliable

Starter.....

All students to complete the following questionnaire in silence!

Year 10 Questionnaire

Please answer the following questions as accurately as you can, so that your data can be used.

1. Do you agree that school dinners should be improved?
☐ Yes ☐ Maybe ☐ No
2. Have you ever stuck chewing gum under a desk at school?
☐ Yes ☐ No
3. How often do you socialise with your friends outside school?
☐ Very often ☐ 3 times a week ☐ Sometimes ☐ Rarely
4. About many text messages do you send per week?
☐ 0-9 ☐ 11-19 ☐ 21-29 ☐ 31-39 ☐ 40 or more
5. Do you think that there are enough extra-curricular activities provided at school to meet your interests, or would you like there to be more lunchtime or after-school clubs for music or sport?
☐ Agree ☐ Disagree ☐ Music ☐ Sport ☐ Both
6. Roughly how much time do you spend doing homework each evening?
☐ More than an hour ☐ Ages ☐ Not very long ☐ Hardly any
7. Roughly how much money have you spent on clothes in the last month?
☐ £0 - £15 ☐ £15 - £30 ☐ £30 - £45 ☐ More than £45
8. Do you agree that smoking should be banned from public places because it affects the health of non-smokers?
☐ Yes ☐ No
9. "It is a good idea that students wear school uniform as it promotes good behaviour".
☐ Strongly agree ☐ Agree ☐ Not sure ☐ Disagree ☐ Strongly disagree

Which questions will give useful answers, which will be informative when they are analysed?

Which questions were phrased in a way to possibly influence your answer (biased)?

Which questions gave answers which aren't particularly useful, in terms of data analysis?

Which questions were difficult to answer? Why?

Which questions might you have been tempted to give a false answer to?

A **questionnaire** is a set of questions designed to obtain data from a population.

All questionnaires should:

- **Be clear and brief** as possible.
- Use simple language and avoid personal questions
- **Avoid leading questions** e.g., Do you agree that pub opening hours are too long?
- **Avoid 'open questions'** e.g What do you think of the government?
- **Provide balanced tick boxes** so that questions can be easily answered and processed (closed question), no gaps, no overlaps



Classwork:

- 1) (i) Criticise each of these questions
(ii) Write a better version of each one

Don't you agree that lunchtime is too short?

Yes ☐ No ☐ Not sure ☐

What do you think of school food?

Excellent ☐ Good ☐ OK ☐

How much do you spend on sweets?

up to £1 ☐ £2 to £3 ☐ £4 or more ☐

How much television do you watch each week?

- 2) A mobile phone company wants to find out about the age and gender of its customers, how often they use their phone and what features they find most useful. Suggest 5 questions that they could ask together with suitable tick boxes.



Sampling

Page 330 E11.1 - discussion exercise

MyMaths Sampling Lesson



Ways to select a sample that is **REPRESENTATIVE** and not **BIASED**

- 1) Simple Random Sample
- 2) Systematic Sample
- 3) Stratified Sample (**grade A**)

Simple Random Sample

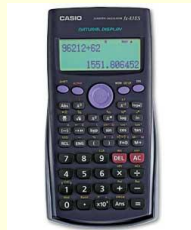
First..... give everyone a number

Then..... choose numbers at random by

- hat
- Ran# on calculator
- random numbers generated by computer.

OR

OR



[click here!](#)

Systematic Sample

We want a sample of 20 from the first 100 students to arrive at school.....

$100 \div 20 = 5$. Choose every 5th person.



We want a sample of 50 people from the first 150 people arriving at the train station

$$150 \div 50 = 3$$

Choose every 3rd person



Stratified Sample (Grade A)

.....has the same proportion of each group ('strata') in the **SAMPLE** as there are in the **POPULATION**.
This will make it **REPRESENTATIVE**.

Example 1

There are 50 boys and 100 girls in the tennis club. A student committee is to be made up of 30 players. How many boys and how many girls should be selected?

$$\text{Boys: } \frac{50}{150} \times 30 = \underline{\underline{10}} \text{ boys}$$

$$\text{Girls: } \frac{100}{150} \times 30 = \underline{\underline{20}} \text{ girls}$$



Example 2

This table shows the number of students in each year group. How many students should be selected from each year group to make up a sample of 40 students?

Year	Number in year
10	58
11	72
Sixth Form	135

$$\text{Year 10: } \frac{58}{265} \times 40 = 8.75 \therefore \underline{\underline{9}}$$

$$\text{Year 11: } \frac{72}{265} \times 40 = 10.87 \therefore \underline{\underline{11}}$$

$$\text{Sixth Form: } \frac{135}{265} \times 40 = 20.37 \therefore \underline{\underline{20}}$$

$$20 + 11 + 9 = \underline{\underline{40}}$$



Example 3

Age of Hockey Club Members	Girls	Boys
10-12	31	18
13-15	24	22
16-18	17	28
over 18	12	8

A representative sample of 25 players is required.....

a) How many boys age 10 to 12 should be chosen?

$$\text{a) } \frac{18}{160} \times 25 = 2.81 \therefore \underline{\underline{3}}$$

b) How many over 18 girls?

$$\text{b) } \frac{12}{160} \times 25 = 1.87 \therefore \underline{\underline{2}}$$



