

## 1A Populations & Samples

Population

Census

Sample

Sampling Frame

	Advantages	Disadvantages
<b>Census</b>	→ Completely accurate result	→ Time consuming → Cannot be used if the sampling process would render the items unusable → Processing a lot of data takes a long time
<b>Sample</b>	→ Less time-consuming → Fewer responses needed → Less data to process	→ Data might not be accurate → Sample might not be properly representative of the population

1. A supermarket wants to test a delivery of avocados for ripeness by cutting them in half.
  - a) Suggest a reason why the supermarket should choose a sample rather than a census

The supermarket tests a sample of 4 avocados and find that 4 of them are ripe. They estimate that 80% of the total are ripe.

- b) Suggest a way this estimate could be improved

## 1B Random Sampling (Simple Random, Systematic & Statified)

Simple Random

Systematic

Stratified

	Advantages	Disadvantages
Simple random sampling	<ul style="list-style-type: none"><li>→ Free of bias</li><li>→ Easy and cheap to implement</li><li>→ Every unit has an equal chance of selection</li></ul>	<ul style="list-style-type: none"><li>→ Not suitable for a large population or sample size</li><li>→ A sampling frame is needed</li></ul>
Systematic Sampling	<ul style="list-style-type: none"><li>→ Simple and quick to use</li><li>→ Suitable for large samples and populations</li></ul>	<ul style="list-style-type: none"><li>→ A sampling frame is needed</li><li>→ Possible bias as units do not have an equal chance of selection</li></ul>
Stratified Sampling	<ul style="list-style-type: none"><li>→ Sample accurately reflects the population</li><li>→ Guarantees proportional representation of groups</li></ul>	<ul style="list-style-type: none"><li>→ Population must be classified into groups which can be time-consuming</li><li>→ Selection within a group has the same issues as simple random sampling</li></ul>

1. A yacht club with 100 members are listed alphabetically in the club's membership book. The committee wants to take a sample of 12 members to fill in a questionnaire.
  - a) Explain how they could use a random number generator to generate the sample

- b) Explain how they could use a lottery system to generate the sample

2. A factory manager wants to find out what his workers think of the canteen facilities. He decides to give a questionnaire to a sample of 80 workers. It is believed that different age groups will have different opinions.

The table to the right shows the number of workers in each age bracket.

- a) What sampling method should be used?

Age	Quantity
18-32	75
33-47	140
48-62	85

- b) How many workers should be selected from each age bracket?

## 1C Non-Random Sampling (Quota & Opportunity)

Quota Sampling

Opportunity Sampling

	Advantages	Disadvantages
Quota Sampling	<ul style="list-style-type: none"><li>→ Allows a small sample to represent the population</li><li>→ No sampling frame required</li><li>→ Quick and inexpensive</li><li>→ Allows comparison between groups</li></ul>	<ul style="list-style-type: none"><li>→ Potential for bias to be introduced</li><li>→ Can take time to divide the population into groups after</li><li>→ A more in-depth study would require an increasing number of different groups</li><li>→ Some people might not be willing to take part</li></ul>
Opportunity Sampling	<ul style="list-style-type: none"><li>→ Easy to carry out</li><li>→ Inexpensive</li></ul>	<ul style="list-style-type: none"><li>→ Unlikely to give a proportional sample</li><li>→ Researcher's ability can affect the outcome</li><li>→ People might not want to be interviewed/asked</li></ul>

## 1D Types of Data

Quantitative Data

Qualitative Data

Discrete Data

Continuous Data

Class Boundaries

Length of wing (mm)	Number of butterflies, f
30-31	2
32-33	25
34-36	30
37-39	13

Midpoint

Class Width

1. Is the length Qualitative or Quantitative?

Length of wing (mm)	Number of butterflies, f
30-31	2
32-33	25
34-36	30
37-39	13

2. Is the length Discrete or Continuous?

3. Write down the class boundaries, midpoint and class width for the class 34-36