Statistical Bias

Statistical bias occurs when a systemic error contributes to the statistics for a sample being different from those of the actual population. This affects the accuracy of the results of a study/survey. Bias can be intentional or unintentional.

Sampling Bias: Occurs when the sample does not reflect the population being studied (sample too small or not representative of all parts of a population)

Non-Response Bias: Occurs when there is a low overall response rate (this is common when the submission of responses is voluntary, as with a mail-in survey)

Measurement Bias: Occurs when the measurement technique has errors which cause unreliable results

Response Bias: Occurs when survey participants purposely give false or misleading answers (perhaps because they don't want to be embarrassed or they are trying to influence the results in a certain way). Response bias can also result from leading questions, where the question favours one response over another.

Example: Identify the type of bias in each scenario. Suggest how the bias could be eliminated.

1. A class of grade 9 boys was asked by their physical education teacher to put of their hands if they had ever been on a date.

2. A pollster in a shopping mall randomly selected people to interview as they walked by.

3. A question asks, "Do you think the Liberal party should be re-elected to continue its good work on the environment?"

4. A neighbourhood survey about children's playground equipment in a local park was sent to randomly selected households with an envelope for them to use to send their responses back.

5. On a radio call-in show that covers controversial topics such as gun control and youth crime, callers are routinely asked to call in to respond to the commentary.

6. When recording the volume of a solution after a chemical reaction, the lab assistant wrote some of the units using the abbreviation ML instead of ml which confused the person doing the analysis because ML is the abbreviation for megalitres.

7. To determine how people felt about a new product, 20 people were interviewed through a random selection of telephone numbers.