

Biased data: Student worksheet

<http://topdrawer.aamt.edu.au/Statistics/Good-teaching/Data-collection/Bias-in-data/Biased-data>

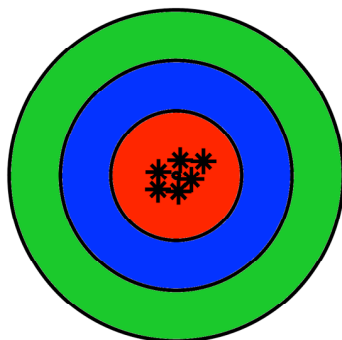
When you measure data you aim to be as accurate and as precise as possible.
To be accurate, the measured value should be close to the actual or true value.
To be precise in your measurements, the measured values should be close to each other.

Three dart players were aiming for the target

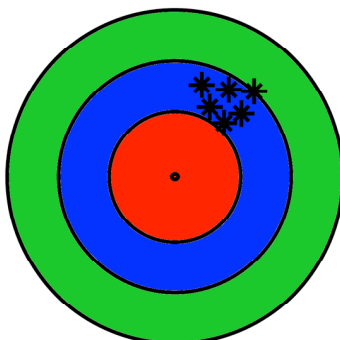
Perry was very precise.
Alf was very accurate.
Patsy-Ann was accurate and precise.

1. Identify which dartboard belonged to:

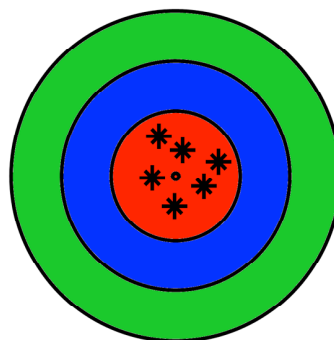
Perry Alf Patsy-Ann



1



2



3



If you measure something several times and all values are close, they *may* all be wrong if there is a 'bias'. *Bias* can be due to a systematic (built-in) error, which makes all measurements wrong by a certain amount.

2. Which of the following inaccuracies could create a bias in the measured data?

The scales read '1 kg' when there is nothing on them. **bias / not a bias**

You record the length as 23.6 cm instead of 26.3 cm. **bias / not a bias**

You left the packaging on only one of the objects that you weighed. **bias / not a bias**

You always measure your height wearing shoes with thick soles. **bias / not a bias**

Your stopwatch takes half a second to stop when clicked. **bias / not a bias**

The tape measure you used had 2 cm missing from the start of it. **bias / not a bias**

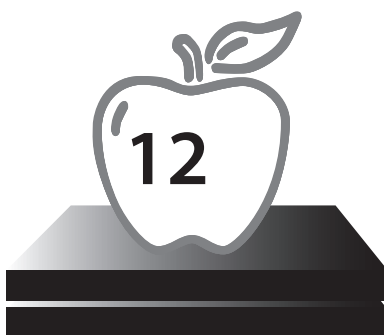
3. Can you think of other ways that you could have measured very precisely but did not achieve accurate measurements?

Degree of accuracy

You can be very precise but the degree of accuracy also depends on the instrument you are measuring with.

If you are using an instrument that measures in whole grams, you have an error of ± 0.5 grams.

You place a piece of fruit on the scale and it shows that it weighs 12 grams.



4. Which of the following might be the actual weight of the fruit?

10.9 g 11.6 g 12.4 g 11 g 12.0 g

5. What is the smallest weight the object could be?

6. What is the largest weight the object could be?

Random sampling

If you are asking people a question to get information for your investigation, you should try to get a random sample without any bias.

Whether a sample is random depends on the question you ask.

The question you are investigating is: Do young people these days use their mobile phones too much?

7. Which group of people might be a random sample for this question?
Explain your answer.
 - (a) people at a skate park
 - (b) people at a retirement seminar
 - (c) people at a cricket match.

8. Think of a question for which each of the groups above might be considered a random sample.

9. So as not to bias your survey, you must try to choose randomly.
Describe how you could select a random sample from:
 - (a) your class
 - (b) your school
 - (c) your suburb
 - (d) your city.