

Measurement and Error

September-09-16 2:05 PM

Accuracy

→ How close you are to the true value.

Nearly impossible to tell accuracy

Precision

→ How consistent the measurements are.

Systemic Errors

- Errors that are the same every time.

Fixed by

→ Fixing equipment or

→ Getting other people to do the experiment elsewhere

Statistics Vocab: Average = Mean

How good is our data? How precise

Standard Deviation

a tool that tells us how precise our data is.

excel
=STDEV.P(Data set) ± 0.5928

Random Errors

- Errors that different every time.

→ stopwatches

Fixed by

→ Taking multiple measurements and averaging the result.

13.342

Error Values



47.5 cm

48 cm

47.9 cm

47.75 ~~32415~~ cm

the smallest mark is mm.

↓
I'd be able to estimate 0.5 mm

Anything smaller is meaningless

that's the way I could estimate

47.75 ~~32415~~ cm

meaningless

There's no way I could estimate this!

This gives us error margins. Error margins are our smallest amount we are able to estimate. $\Rightarrow \pm 0.5\text{mm}$

$$47.75\text{cm} \pm 0.65\text{cm}$$

Significant Figures.

How many students are in Handsworth?

1500
↑ Significant ↓ placeholders.

① Start counting when you reach the first non-zero number.

② Non-zero numbers are always significant

2.6327 ← 5 sig Figs

③ Zero is significant if

4 sig Figs
↓
2004

a) It is sandwiched between non-zero numbers

b) a decimal follows the zeroes

7300.

↑ means exactly
7300

c) numbers < 1 zeroes after the first sig fig

d) numbers > 1 all zeroes after the decimal

28.00 ← 4 sig Figs

0.00230 ← 3 sig Figs
place holders sig