Accuracy and Precision

They mean slightly different things!

Accuracy

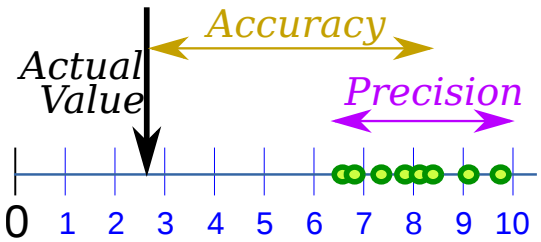
Accuracy is how close a measured value is to the **actual (true) value**.

Precision

Precision is how close the measured values are **to each other**.

Examples

Here is an example of several values on the number line:



And an example on a Target:

High Accuracy Low Precision	Low Accuracy **High Precision**	**High Accuracy** **High Precision**

Example: Hitting the Post

If you are playing football and you always hit the right goal post instead of scoring, then you are **not** accurate, but you **are** precise!

How to Remember?

- a**C**curate is **C**orrect (a bullseye).
- p**R**ecise is **R**epeating (hitting the same spot, but maybe not the correct spot)

Bias (don't let precision fool you!)

When we measure something several times and all values are close, they **may** all be wrong if there is a "**Bias**"

Bias is a systematic (built-in) error which makes all measurements wrong by a certain amount.

Examples of Bias

- The scales read "1 kg" when there is nothing on them
- You always measure your height wearing shoes with thick soles.
- A stopwatch that takes half a second to stop when clicked

In each case **all** measurements are wrong by the same amount. That is bias.

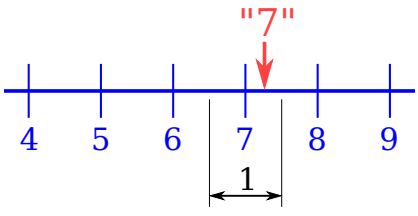
Degree of Accuracy

Degree of Accuracy depends on the instrument we are measuring with. But as a general rule:

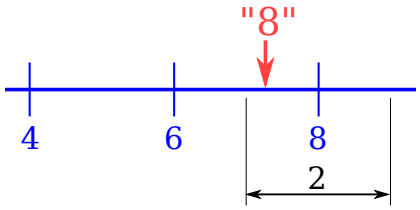
The Degree of Accuracy is **half a unit** each side of the unit of measure.

Examples:

When an instrument measures in "1"s
any value between **6½** and **7½** is measured as **"7"**



When an instrument measures in "2"s
any value between **7** and **9** is measured as **"8"**



(Notice that the arrow points to the same spot, but the measured values are different!
Read more at Errors in Measurement .)

We should show final values that match the accuracy of our **least** accurate value used.

Example: We are told the dog is about 2 feet high.

We can convert that to 609.6 mm, but that suggests we know the height to within 0.1 mm!

So we should use **600 mm**

Question 1 Question 2 Question 3 Question 4 Question 5 Question 6
Question 7 Question 8 Question 9 Question 10

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