

Accuracy vs Precision

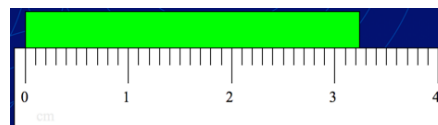
Accuracy and precision describe the errors in a measured value.

- **Accuracy** is the degree to which a measured value differs from the actual value of that quantity
- **Precision** is the degree to which a series of measurements differ from each other.

Measurement precision

You should always read measured quantities to one significant figure more than the numbers read directly on the scale.

- You would report the length of the green bar at right as 3.23 (or maybe 3.22 or 3.24, according to your eyes).
- The first two digits are directly read from the scale and the final digit is estimated.



Quantifying Accuracy

Accuracy is quantified as a **percent error** from the actual value:

$$\text{Percent error} = \frac{\text{measured value} - \text{actual value}}{\text{actual value}} \times 100$$

Quantifying Precision

- Precision is often expressed as the **number of significant figures** in the reported measurement.
Thus, the green bar above is measured to three significant figures.
- Precision can also be expressed as a **"margin of error,"** which is $\frac{1}{2}$ the size of the least significant digit in the measurement.
Thus, the length of the green bar above is 3.23 with a margin of error of .005.