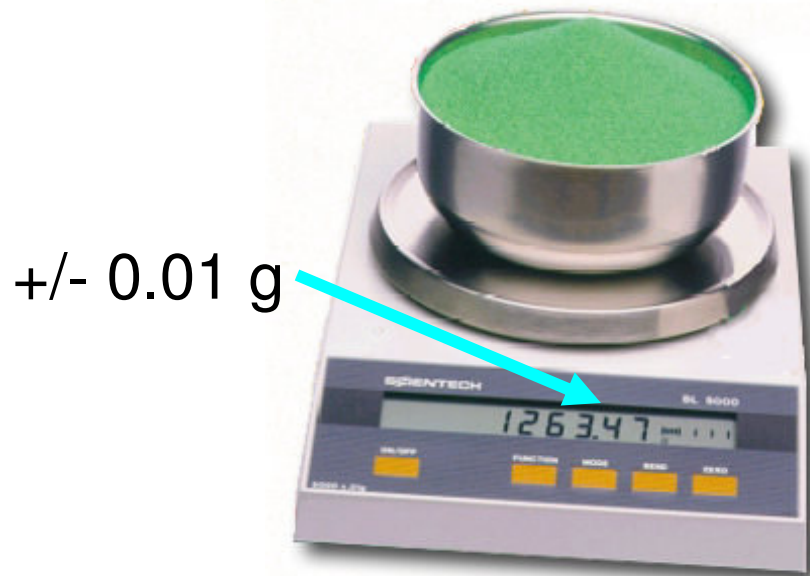
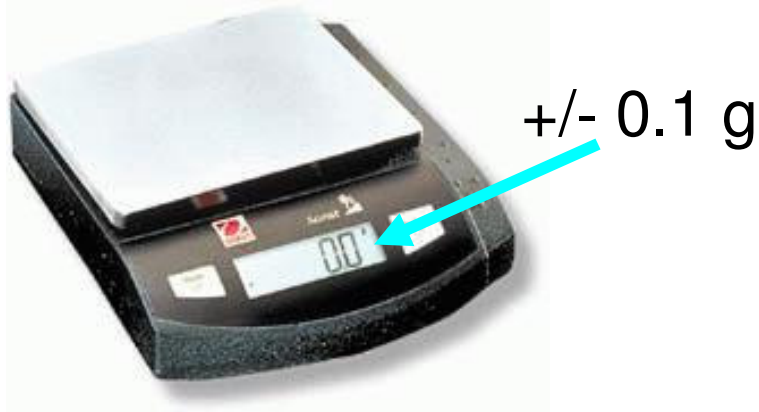


# Precision, Uncertainty and Accuracy



Not very precise!

# Precision, Uncertainty and Accuracy





## Very Precise (Analytical) Balance

Uncertainty =  $\pm 0.0001$  g

# Precision

- The number of significant digits to which a value has been reliably measured.
- The more decimal places, the more precise the measurement.
- The greater the precision, the less the uncertainty.

# Uncertainty

- How much a measurement from an instrument can vary during a measurement.
- Usually expressed as +/- (eg. 46.63 +/- 0.01 g means the measured mass could be between 46.62 and 46.64 g.)
- The smaller the uncertainty, the more precise the measurement
- Readings must be written to the number of dec. places which reflect the uncertainty of the instrument.  
(eg. 46.42 would be OK for a balance with an uncertainty of +/- 0.01 g or 46.416 would be OK for a balance with an uncertainty of +/- 0.001 g)

# Accuracy

The **accuracy** of a measurement is how close the measurement is to an *accepted standard*. (eg. a “standard” or “calibration” weight which comes with a new balance)

# Significant Digits (Figures)

The number of **significant digits** in a measurement is the number of **certain digits** plus one more (with some uncertainty)

For the measurement **98.76** g

Certain digits      Uncertain

This measurement has \_\_\_\_\_ significant digits.