Math Essentials

Precision vs. Accuracy

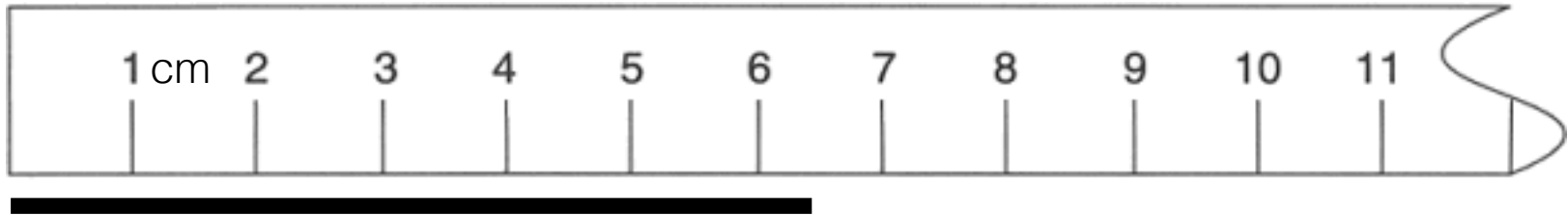| Accurate Precise | Not Accurate Precise | Accurate Not Precise | Not Accurate Not Precise |

Precision: The closeness of a set of measurements to each other

Accuracy: The closeness of measurements to the correct or accepted value

Significant Figures ("sig figs"): The number of all known digits reported in a measurement, plus one estimated digit.

What should be the reported length of the black line?

Draw this diagram!

To be completed in class!
(leave space to write a measurement)

Rules for Determining the Number of Sig Figs in a Measurement

All nonzero digits are significant

721 mm	3 sig figs
2,398 g	4 sig figs
3.4 x 10^{-4} s	2 sig figs

Rules for Determining the Number of Sig Figs in a Measurement

Zeros that are between nonzero digits are significant.

106 K   3 sig figs

2,001 kg   4 sig figs

Rules for Determining the Number of Sig Figs in a Measurement

Zeros alone on the left are never significant (place holders).

0.0**53** m   2 sig figs

0.0000**2** s   1 sig fig

Rules for Determining the Number of Sig Figs in a Measurement

Zeros alone on the right are significant if there is a <u>decimal point</u> somewhere in the number (accuracy).

1210 m (place holder)   3 sig figs

200. K   (accuracy)   3 sig figs

80.00 g   (accuracy)   4 sig figs

Counting numbers and exact numbers have an infinite number of significant figures

10 pairs	∞ sig figs
76 dogs	∞ sig figs
1 ft = 12 in (conversion factor)	∞ sig figs

Sig Fig Practice

How many sig figs are in each of the following measurements?

a. 28.6 g

b. 2440. cm

c. 910 m

d. 0.04604 L

e. 0.0067000 kg

To be completed in class!
(leave space to the right of each number)

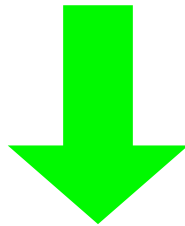# Scientific Notation

only *one* digit to the left of the decimal

$$N \times 10^n$$

a power of 10

Scientific Notation

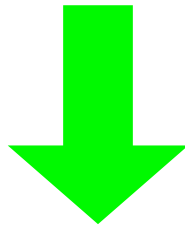Ex: Express 1234.56 in scientific notation.

1234.56

$$1.23456 \times 10^3$$

if positive exponent, number is _bigger_ than 1

Scientific Notation

Ex: Express 0.00657 in scientific notation.

0.00**6**57

$$6.57 \times 10^{-3}$$

if negative exponent, number is _smaller_ than 1

Scientific Notation Practice

Express the following measurements in scientific notation. Be sure to maintain the number of significant figures.

a. 5,453,000 km

b. 300.8 g

c. 0.00536 mm

d. 0.0120325 mg

e. 34,800 s

**To be completed in class!
(leave space to the right of each number)**