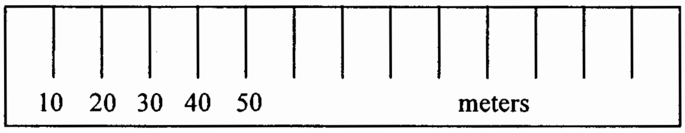
Name Key

Worksheet—Significant Figures and Measurement

A measurement is given. Part 1: Draw several markings on a ruler (for length) or graduated cylinder (for volume) or thermometer (for temperature) that were used to get the measurement. Part 2: State what place the marking indicates. Part 3: State the number of significant figures in the measurement.

Example: 15 m ANSWER:



Part 1: See ruler above.

Part 2: Marked to the 10s place (ones place is estimated)

Part 3: 15 m is 2 significant figures

last certain digit indicates marking

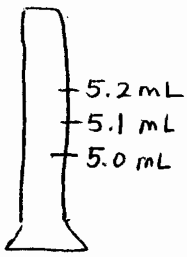
* sig figs = all certain digits AND one estimated digit → this means the last sig fig is estimated

marked

a. 5.04 mL

estimated

1)



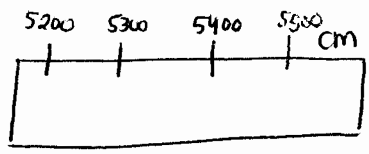
2) marked to 0.1 (tenths) place (0.01 is estimated)

3) 5.04 mL is 3 SFs.

marked est.

b. $54\bar{0}0$ cm

1)



2) marked to 100s place (estimated @ last sig fig — tens pla

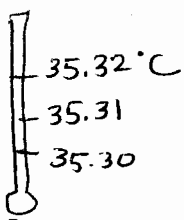
3) $54\bar{0}0$ cm is 3 SFs.

estimated

c. 35.300 degrees Celsius

marked

1)



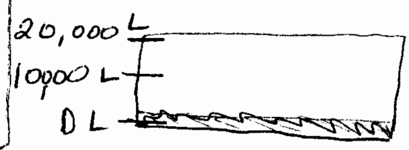
2) marked to 0.01 place (hundreths) estimated @ 0.001 °C.

3) 35.300 °C is 5 SFs (last one is estimated)

d. 1000 L

(only 1 sig fig! it's estimated! So it's marked to 10,000 L!)

1)



2) marked to 10,000 L

3) 1 SF.

yeah, I know it's strange!

Name Key

Worksheet—Significant Figures and Scientific Notation

1. How many significant figures are in:

   a. 1.204×10^{-2} g 4 SFs
   b. 3.160×10^{8} Å 4
   c. 0.00281 g 3 2.81×10^{-3} g
   d. 810 ml 2 (note: $81\bar{0}$ or 810. is 3 SFs ; 8.1×10^{2} is 2 SF ; 8.10×10^{2} is 3 SF)
   e. 12.82 liters 4 1.282×10^{1} L
   f. 3.19×10^{15} atoms 3
   g. 4.300×10^{-6} cm 4
   h. 0.00641 g 3 6.41×10^{-3} g
   i. 8.2354×10^{-19} m 5
   j. 0.0559 g 3 5.59×10^{-2} g
   k. 2.92×10^{2} g 3
   l. 4.1 liters 2 4.1×10^{0} L
   m. 0.0002 cm 1 2×10^{-4} cm
   n. $45\bar{0}$ g 3 4.50×10^{2} g (4.5×10^{2} g is only 2 SF!)

2. Convert the standard (*decimal*) notation numbers above into standard *scientific* notation. Remember to carry all significant figures into the coefficient.

3. Assign ± error readings to the following measurements (hint—which digit has uncertainty?) Assume units of 1 (0.1, 0.01, etc…)

   a. 3.412 g ± 0.001 g
   b. 45 ml ± 1 mL
   c. 0.00498 g ± 0.00001 g
   d. 8.2 cm ± 0.1 cm
   e. 559 L ± 1 L
   f. 1.00×10^{2} m

   → $1\bar{0}\bar{0}$ m ± 1 m.
   or 100. m ± 1 m

use units!