

Precision Measuring Lab **ANSWERS**

(Figuring those Significant Figures When Measuring)

Purpose:

Space travel requires very precise measuring. On the long journey to Earth 2.0 it is imperative that we get that part as precise as possible. Today you will practice measuring to prepare for the trip.

Directions:

Measure the following items (measure using the proper number of **significant figures (plus one rule)**). Create a **data table** in your **digital notebook** to record your measurements (**before** you start).

1. The **mass** of the **black cube and white cube** in grams.
2. The **mass** of the **white golf orb** in grams.
3. The **volume** of the **black cube and white cube** in cm^3 ($l \times w \times h$).
4. The **volume** (using water displacement) of a **white golf orb** in cm^3 ($1 \text{ mL} = 1 \text{ cm}^3$).
5. The **length** of the **thermal measuring device** and **diameter** or the **water bottle cap** in cm.
6. The **volume** of **dihydrogen monoxide** in water bottle in mL.
7. The **temperature** of the water in the water bottle in ($^{\circ}\text{C}$)

Record your results into your data table. Remember to record using the proper number of significant figures (**plus one rule**). It all depends on the **precision** of your instrumentation.

Data Table:

Object	Measurement	Convert to	
Mass of Black Cube	24.36 g	.02436 kg	.8593 oz.
Mass of White Cube	14.55 g	.01455 kg	.5132 oz.
Mass of White Golf Orb	46.10 g	.04610 kg	1.626 oz.
Volume of White & Black Cubes	(2.6 cm x 2.6 cm x 2.6 cm) = 17.576 cm^3 = 18 cm^3	18 mL	1.1 in^3
Volume of White Golf Orb	46.3 ml	46.3 cm^3	2.83 in^3
Length of thermal measuring device	15.4 cm	154 mm	6.06 in
Length (Diameter) of water bottle cap	2.7 cm	27 mm	1.06 in
Volume of dihydrogen monoxide	265 ml (600 ml beaker) or 266.0 ml (100 ml grad cylinder)	.265 L or .2660 L	8.96 FL. oz.
	(Answers can vary ± 20.0 ml)		
Temperature of water	20.8 $^{\circ}\text{C}$	69.4 $^{\circ}\text{F}$	20.8 $^{\circ}\text{C}$
$^{\circ}\text{C}$ to $^{\circ}\text{F}$ = (add 40 x 1.8 subtract 40) $^{\circ}\text{F}$ to $^{\circ}\text{C}$ = (add 40 \div 1.8 subtract 40)		(temperature is ± 2.0 $^{\circ}\text{C}$ or 4.0 $^{\circ}\text{F}$)	