Name: _____ Section: _____ Date: _____

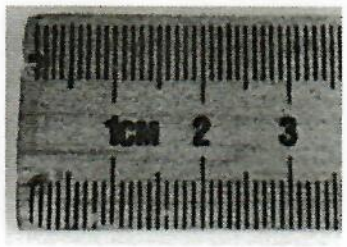
Worksheet - Exp 1: Measurement and Analysis

Theory: Any instrument has a limited resolution (smallest degree of measure). This brings an inherent degree of uncertainty to all scientific measurements.

The uncertainty is: Equal to the resolution for digital instruments
Equal to $\frac{1}{2}$ the resolution for analog instruments

Measurements made on a vernier caliper and measurements of time are considered digital.

1. Find the resolution and uncertainty in these measurements: (12 pts)



Resolution: _____ Resolution: _____ Resolution: _____

Uncertainty: _____ Uncertainty: _____ Uncertainty: _____

Procedure:

Part 1: Measuring Density

Table 1: Ruler & Triple Beam Balance

Metal Cylinder Measurements		
Mass:	(_____ ± _____)	_____
Height:	(_____ ± _____)	_____
Diameter:	(_____ ± _____)	_____
Volume:	(_____ ± _____)	_____
Density:	(_____ ± _____)	g/cm^3

2. Zero the triple beam balance.

3. Measure the mass of the metal cylinder provided (4 pts). What is the resolution of the balance? _____ (2 pts) Use this to determine the measurement uncertainty (2 pts).

4. Measure the height and diameter of the metal cylinder using the ruler, be sure to include the uncertainty of the ruler (4 pts).

5. Calculate the volume of the cylinder (4 pts). This is equal to the area of the base times the height. Show work below.

6. What is the density, ρ, of the metal cylinder? (2 pts)

7. Identify the metal in the cylinder using the density chart provided (and hopefully, a little common sense). Compare your value of density to the accepted value. What is your percent error? (6 pts)

Table 1 Results

Metal: _____

% Error = _____ %

Table 2: Caliper & Digital Balance

Metal Cylinder Measurements		
Mass:	(_____ ± _____)	_____
Height:	(_____ ± _____)	_____
Diameter:	(_____ ± _____)	_____
Volume:	(_____ ± _____)	_____
Density:	(_____ ± _____)	g/cm^3

Table 2 Results

Metal: _____

% Error = _____ %

8. Repeat Steps 2-7 with a Caliper and Digital Balance