Chapter 1 Test Review (Gen) Name: _____

Accuracy, Precision, & Percent Error

1) A student measured the temperature of a boiling solution and found it to be 56.0°C. The theoretical temperature of that boiling solution is 55°C. What is the percent error in the student's measurement?

1.8%

2) The density of a nickel was determined in an experiment to be:

Trial 1: 7.25 g/mL Trial 2: 7.23 g/mL Trial 3: 7.28 g/mL

The theoretical density of a nickel is 8.91 g/mL.

A) What is the percent error of the measurements collected in the experiment?

average = 7.25 g/mL 18.59%

B) Is the data precise, accurate, neither, or both? Explain your answer.

- precise b/c the data is close to each other
- not very accurate b/c not close to the true value

Measurement

Put in scientific notation:

3) 504,000 5.04×10^5

4) 0.003079 3.079×10^{-3}

5) 0.040 4×10^{-2}

6) 1,405,000,000 1.405×10^9

Take out of scientific notation:

7) 5.12×10^{-3} 0.00512

9) 8.6×10^5 860000

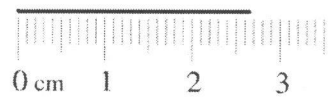
8) 4.20×10^4 42000

10) 3.0×10^{-4} 0.0003

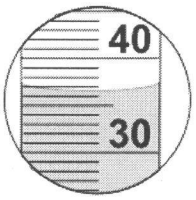
11) Circle the estimated digit in each measurement: 54.39 g 31.571 mL 70.0 °C

12) Measure the following using the correct number of significant figures.

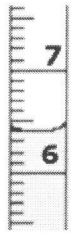
A) 2.67 cm



B) 36.7 mL



C) 6.39 mL



Unit Conversions

13) Convert 478000 mg to kg

0.478 kg

14) Convert 8.90 L to mL

8900mm

15) Convert 48,000 seconds to days

0.56 days

16) You drive 5.90 miles to school each day. Your car says it has enough gas to travel 9 km (you bought the car in Canada!). Do you have enough gas to get to school?

You have enough gas to travel only 5.59mi

Significant Figures

How many significant figures are in the following?

17) 70.0 g 3
18) 0.0069 mg 2
19) 5.60×10^4 km 3
20) 0.0400 mL 3
21) 6200 cm 2
22) 200 mi 1
23) 2.0×10^{-3} kL 2
24) 403.00 g 5
25) 0.24 mm 2

16) 28.21 g + 3.829 g + 45.8 g

77.8 g

17) 2.36 m x 17.00 m x 0.088 m

3.5 m^3

18) 24.00 cm/6.00 cm

4.00

19) 65.344 mL – 18.67 mL

46.67 mL

Experimental Design

Steven wanted to determine how the amount of sugar that is soluble in water changes with the temperature of the water. He bought a large bag of sugar from the grocery store to make sure the sugar was the same throughout the experiment. Steven also decided to test each temperature of water four times in beakers of the same size filled with 100 mL of distilled water. He tested room temperature (18°C), 25°C, and 30°C samples of water. When adding the sugar, he made sure to only stir until the sugar dissolved. He discovered that the greatest amount of sugar dissolved in the water that was 30°C.

Independent Variable: temp. of water

Levels of IV	(control) 18°C	25°C	30°C	
# of Trials	4	4	4	

Dependent Variable: mass of sugar that dissolves

Constants: same bag of sugar; same size beaker; same volume of water; used distilled water for each temp.; same stopping point for stirring

Enrichment Problem *(optional if extra time is left in class)*

The density of brass was tested in an experiment using water displacement in three trials. The data collected is given below.

	Mass	Starting Volume	Final Volume	Displacement	Density
Trial 1	8.68 g	15.2 mL	16.6 mL	1.4 mL	6.2 g/mL
Trial 2	14.52 g	18.9 mL	21.5 mL	2.6 mL	5.58 g/mL
Trial 3	13.11 g	13.4 mL	15.6 mL	2.2 mL	5.96 g/mL

The theoretical density of brass is **8.40 g/mL**.

Avg = 5.91 g/mL

Based on the percent error for the density data collected in this experiment, is the data accurate?

-29.6% NO... not accurate