Honors Chemistry Name:_____ Period:_____ Date:_____

Show all related equalities prior to solving these problems. Show all your work, units and report all answers with the correct number of significant figures. Box all your answers.

Dimensional Analysis Practice KEY

1. Sodium hydrogen carbonate, known commercially as baking soda, reacts with acidic materials such as vinegar to release carbon dioxide gas. An experiment calls for 0.348 kg of sodium hydrogen carbonate. Express this mass in milligrams.

1 kg = 1000 g 1 g = 1000 mg

0.348 kg	1000 g / 1 kg	1000 mg / 1 g	3.48×10^5 mg

2. The different colors of light have different wavelengths. The human eye is most sensitive to light whose wavelength is 555 nm (greenish-yellow). What is this wavelength in millimeters?

10^9 nm = 1 meter 1 meter = 1000 mm

555 nm	1 meter / 10^9 nm	1000 mm / 1 meter	5.55×10^{-4} mm

3. The total amount of fresh water on earth is estimated to be 3.73×10^8 km^3. What is this volume in cubic meters? What is this in Liters?

1 km = 1000 meters 1 meter = 100 centimeters

3.73×10^8 km^3	1000 meters / 1 km (3)	100 cm / 1 meter (3)	1 mL / 1 cm^3	1 L / 1000 mL	3.73×10^{20} L

3.73×10^{17} m^3

4. The acidic constituent in vinegar is acetic acid. A 10.0 mL sample of a certain vinegar contains 483 mg acetic acid. What is this mass expressed in micrograms?

10^3 mg = 1 gram 1 gram = 10^6 μg

483 mg	1 gram / 10^3 mg	10^6 μg / 1 gram	4.83×10^5 μg

5. A submicroscopic particle suspended in a solution has a volume of 1.4 μm^3. What is this volume in liters?

1 μm = 10^{-6} meters 1 meter = 100 cm 1 cm^3 = 1 mL 1 mL = 10^{-3} Liters

1.4 μm^3	10^{-6} meters / 1 μm (3)	100 cm / 1 meter (3)	1 mL / 1 cm^3	10^{-3} Liters / 1 mL	1.4×10^{-15} Liters