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**Worksheet 1**

1. Perform the following temperature conversions:
   1. 300 K to °F
   2. 300°F to K
   3. –40° F to °C
2. A sample of motor oil weighing 440 g occupies 500 mL. What is the density of the motor oil? **(0.88 g/ml)**
3. What is the mass in kg of 125.50 moles of Strontium nitrate, Sr(NO3)2? **(26.6 kg)**
4. What is the mass of 57.0 ml of ammonia gas, NH3, at STP? **(0.043 g)**
5. Determine the percent composition of KClO3. **(32% K, 29% Cl, 39% O)**
6. What is the mass in grams of 2.33 mol of penicillin, C16H18O4N2S? **(778.22 g)**
7. You wish to heat water to make coffee. How much heat (in joules) must be used to raise the temperature of 0.180 kg of water from 15°C to 96°C? **(61,002 J)**
8. A piece of an unknown metal with mass 23.8 grams is heated to 100.0°C and dropped into 50.0 ml of water at 24.0°C. The final temperature of the system is 32.5°C. What is the specific heat of the metal? **(1.107 J/g 0C)**
9. For each of the following, draw Lewis electron dot structures. Then use VSEPR to predict shape and indicate bond angles and polarity.
   1. H2S
   2. Br3 1-
   3. CH2Cl2
10. A gas has a pressure of 4.62 atm when its volume is 2.33 L. What will the pressure be when the volume is changed to 1.03 L, assuming constant temperature? **(10.45 atm)**
11. Calculate the energy of a photon that has a frequency of 3.3 × 1013 s-1. **(2.18E-20 J)**