Purpose
To practice converting from mass to moles and moles to mass.

The **molar mass** is the mass per mole of a substance. You can use it to convert between mass and the number of moles. Use your cards created in the group activity to help you solve each problem. Be careful to match the cards to the correct chemical formula!

SHOW ALL WORK!

1. How many moles of NaCN are in 2.5 grams of NaCN?

2. How many moles of KCN are in 2.5 grams of KCN?

3. How many moles of $KAu(CN)_2$ are in 2.5 grams of $KAu(CN)_2$?

4. How many moles of $Mg(CN)_2$ are in 2.5 grams of $Mg(CN)_2$?

5. Check your answers with the teacher. Then carefully record your final answers in the 4th column of the data table below.

6. Discuss with your partner and figure out how to complete the last column of the data table.

Cyanide Compound	Chemical Formula	Molar mass	Number of moles in 2.5 g	Number of moles of CN⁻ in 2.5 g
Sodium cyanide	NaCN	49.0 g/mol		
Potassium cyanide	KCN	65.1 g/mol		
Potassium gold cyanide	KAu(CN)₂	288.1 g/mol		
Magnesium cyanide	Mg(CN)₂	76.3 g/mol		

7. What charge does CN have in KCN and in Mg(CN)2? How do you know?

8. Explain how you determined the number of moles of CN⁻ in each compound.

9. Cyanide is a toxic polyatomic ion found in many compounds. Based on the number of moles of CN⁻ in each compound, place the four compounds in order from most to least toxic.

Part 2: Vitamins

1. People often take vitamins to supplement their diet. Complete the table. Show all work in the space provided

   Convert milligrams to grams.   1 gram = 1000 milligrams

   What are the two conversion factors you can write for this equivalence? _____ OR _____

2. Since a compound consists of bonded atoms, you can simply add the molar masses of each atom in a molecule or formula unit of the compound to obtain the molar mass.

   Example Water, H_2O, is made up of two atoms of hydrogen (Molar mass = 1.01 g/mol) and one atom of oxygen (molar mass = 16.0 g/mol).

   The molar mass of water is = 2(1.01) + 1(16.0) = 18.02 g/mol = 18.1 g/mol)

   Calculate the molar mass of Vitamin B_6.

3. Now practice your mole to mass and mass to mole conversions by filling the rest of the tables.

Vitamin A, Retinol, $C_{20}H_{30}O$ Molar mass = 286.5 g/mol		
Milligrams	Grams	Moles
5,000	5.0	0.017
1,000		
100		

Vitamin B_6, Pyroxidine, $C_8H_{11}NO_3$ Molar mass =		
Milligrams	Grams	Moles
1,000	1.0	
500		
		0.0015

If you Finish Early If there are more than 5 minutes of class time remaining, please turn this paper in to the Red Basket and begin tonight's homework assignment.

READ Lesson 10 pp 388-390. READ Lesson 11 pp. 392-394. DO on p. 394 (#1, 3, 5, 6)