LESSON 78

CLASSWORK

Mountains Into Molehills
Mass-Mole Conversions

Name _____

Date _____ Period _____

Purpose

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

Part 1: Cyanide Compounds

Cyanide, CN^-, is a toxic polyatomic ion found in many compounds. Four of these compounds are shown in the table. You have 2.5 g of each compound.

1. Complete the table. Express molar mass values to the nearest tenth of a gram.

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	0.051 mol	0.051 mol
potassium cyanide	KCN			
potassium gold cyanide	$KAu(CN)_2$			
magnesium cyanide	$Mg(CN)_2$			

2. What charge does CN have in KCN and in $Mg(CN)_2$? How do you know?

3. Explain how you determined the number of moles of CN^- in each compound.

4. Based on the number of moles of cyanide in each compound, place the four compounds in order from most toxic to least toxic.

5. Explain why potassium gold cyanide has so few moles of cyanide compared to the other compounds.

6. Which has more moles of cyanide, 1 g of NaCN or 1 g of KCN?

Part 2: Vitamins

1. People often take vitamins to supplement their diet. Complete the table, converting moles to mass and mass to moles for some common vitamins.

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

Vitamin C, L-ascorbate, $C_6H_8O_6$ Molar mass =		
Milligrams	**Grams**	**Moles**
20,000	20.0	
		0.057
		0.028

2. Which has more mass, 1 mole of vitamin A or 1 mole of vitamin C?

3. Which has more moles of carbon atoms, 169.2 g of vitamin B_6 or 176.1 g of vitamin C?

4. Making Sense Explain how to convert from mass in grams to number of moles if you know the mass and the chemical formula of a compound.

5. How can you convert the number of moles of a substance to mass in grams?

6. If You Finish Early How many molecules of L-ascorbate are in a 1000 mg vitamin C tablet?