Grams, Moles and Molar Mass Worksheet

1. What is the mass of 0.100 mol of each of the substances given below:
   (a) Sodium carbonate, Na_2CO_3
   (b) Ammonium tetraborate, $(NH_4)_2B_4O_7$
   (c) Calcium cyclamate, $Ca(C_6H_{12}NSO_3)_2$

2. How many moles of sodium nitrate are in 1.70 grams of sodium nitrate, $NaNO_3$, a substance used in fertilizers and to make gunpowder.

3. Ammonium sulphate, $(NH_4)_2SO_4$, is a fertilizer used to supply both nitrogen and sulphur. How many grams of ammonium sulphate are in 35.8 moles of $(NH_4)_2SO_4$.

4. A 0.500 mol sample of table sugar, $C_{12}H_{22}O_{11}$, weighs how many grams?

5. A solution of zinc chloride, $ZnCl_2$, in water is used to soak the ends of wooden fenceposts to preserve them from rotting while they are stuck in the ground. One ratio used is 840 grams $ZnCl_2$ to 4 L water. How many moles of $ZnCl_2$ are in 840 grams of $ZnCl_2$?

6. In the early 1970s, thallium sulphate, Tl_2SO_4, a powerful poison, was illegally used in poison baits to control predators such as coyotes on western rangelands. Hundreds of eagles died after taking these baits. A 1.00 kilogram can of Tl_2SO_4 contains how many moles of this compound?

7. A sample of acid has a mass of 200 g. If this sample is know to contain 1.5 moles of atoms, what is the molar mass of the acid?

8. 5.6 moles of a chemical has a mass of 950 grams. What is the molar mass of the sample.

9. Ammonium carbonate, $(NH_4)_2CO_3$, is used as a fertilizer and to manufacture explosives. How many atoms of nitrogen are in 0.665 moles of this substance? How many grams of ammonium nitrate supply this much nitrogen?

10. Sodium perborate, $NaBO_3$, is present in "oxygen bleach". It acts by releasing oxygen, which has bleaching ability. How many grams of sodium perborate are in 4.65 moles of $NaBO_3$?

11. Barium sulphate, $BaSO_4$, is given to patients as a thick slurry in flavoured water before X-rays are taken of the intestinal tract. The barium blocks the X-rays, and the tract therefore casts a shadow that is seen on the x-ray film. How many grams are in 0.568 mole of barium sulphate.

12. Calculate the number of grams in 0.586 mole of each of the following substances?

(a) Water, H_2O

(b) Glucose, $C_6H_{12}O_6$, a sugar in grape juice and honey

(c) Iron, Fe

(d) Methane, CH_4

13. Calculate the number of moles of each substance in 100.0 grams of each of the following samples:

(a) Ammonia, NH_3

(b) Cholesterol, $C_{27}H_{46}O$

(c) Gold, Au

(d) Ethyl alcohol, C_2H_6O

14. Why does 100.0 grams of ammonia, NH_3, have so many more moles than 100.0 grams of cholesterol, $C_{27}H_{46}O$?