

Name : _____ Date : _____



Gram Formula Mass Worksheet



1. What is the percentage by mass composition of Iron (III) oxide?
2. Calculate the molar mass of $C_3H_5N_3O_9$ (Nitroglycerin, an explosive)
3. How many atoms are found in 1.55 grams of chlorine gas?
4. When silver sold for \$16.00 per ounce, how many silver atoms could you buy for 10.00 dollars?
5. How many grams of carbon are there in 14.0 g of $Pb(C_2H_5)_4$ (tetraethyllead, a gasoline additive)?
6. A mixture contains 10.00 g of NaBr and 5.00 g of $BaBr_2$. What is the total number of moles of bromide ions in the mixture?
7. Determine the moles of sodium in 7.22×10^{100} kg of $Na_2S_2O_3$
8. How many atoms of Zn would contain the same number of grams as 7.54×10^{-6} mg of Cu?

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1. What is the percentage by mass composition of Iron (III) oxide?

$$\text{Molar mass of Fe}_2\text{O}_3 = 2 \times 55.85 \text{ g/mol} + 3 \times 16.0 \text{ g/mol} = 159.7 \text{ g/mol}$$

$$\% \text{ Fe} = (2 \times 55.85 \text{ g}) / 159.79 \text{ g} \times 100\% = 69.9\% \text{ Fe}$$

$$\% \text{ O} = 100\% - 69.9\% = 30.1\% \text{ O}$$

2. Calculate the molar mass of $\text{C}_3\text{H}_5\text{N}_3\text{O}_9$ (Nitroglycerin, an explosive)

$$3 \text{ C} = 3(12.0 \text{ g/mol}) = 36.0 \text{ g/mol}$$

$$5 \text{ H} = 5(1.0 \text{ g/mol}) = 5.0 \text{ g/mol}$$

$$\text{Molar mass} = 227.0 \text{ g/mol}$$

$$3 \text{ N} = 3(14.0 \text{ g/mol}) = 42.0 \text{ g/mol}$$

$$9 \text{ O} = 9(16.0 \text{ g/mol}) = 144.0 \text{ g/mol}$$

3. How many atoms are found in 1.55 grams of chlorine gas?

$$1.55 \text{ g} \times (1 \text{ mol Cl}_2 / 71.0 \text{ g}) \times (6.02 \times 10^{23} \text{ Cl}_2 \text{ molecules} / 1 \text{ mole}) \times (2 \text{ atoms Cl} / 1 \text{ molecule Cl}_2) \\ = 2.62 \times 10^{22} \text{ atoms Cl.}$$

4. When silver sold for \$16.00 per ounce, how many silver atoms could you buy for 10.00 dollars?

$$\$10.00 \times (1 \text{ oz Ag} / \$16.00) \times (28.34 \text{ g} / 1 \text{ oz}) \times (1 \text{ mol Ag} / 107.9 \text{ g Ag}) \times (6.02 \times 10^{23} \text{ Ag atoms} / 1 \text{ mol Ag}) \\ = 9.88 \times 10^{22} \text{ atoms}$$

5. How many grams of carbon are there in 14.0 g of $\text{Pb}(\text{C}_2\text{H}_5)_4$ (tetraethyllead, a gasoline additive)?

$$14.0 \text{ g Pb}(\text{C}_2\text{H}_5)_4 \times (1 \text{ mol Pb}(\text{C}_2\text{H}_5)_4 / 323.4 \text{ g Pb}(\text{C}_2\text{H}_5)_4) \times (8 \text{ mol C} / 1 \text{ mol Pb}(\text{C}_2\text{H}_5)_4) \times (12.0 \text{ g} / 1 \text{ mol C}) \\ = 4.13 \text{ g}$$

6. A mixture contains 10.00 g of NaBr and 5.00 g of BaBr_2 . What is the total number of moles of bromide ions in the mixture?

$$10.00 \text{ g NaBr} \times (1 \text{ mol NaBr} / 102.9 \text{ g NaBr}) \times (1 \text{ mol Br} / 1 \text{ mol NaBr}) = 0.09718 \text{ mol Br}$$

$$5.00 \text{ g BaBr}_2 \times (1 \text{ mol BaBr}_2 / 297.1 \text{ g BaBr}_2) \times (2 \text{ mol Br} / 1 \text{ mol BaBr}_2) = 0.0337 \text{ mol Br}$$

$$0.09718 \text{ mol Br} + 0.0337 \text{ mol Br} = 0.1309 \text{ mol Br}$$

7. Determine the moles of sodium in 7.22×10^{100} kg of $\text{Na}_2\text{S}_2\text{O}_3$

$$7.22 \times 10^{100} \text{ kg} \times \text{Na}_2\text{S}_2\text{O}_3 \times (10^3 \text{ g} / 1 \text{ kg}) \times (1 \text{ mol Na}_2\text{S}_2\text{O}_3 / 157.9 \text{ g}) \times (2 \text{ mol Na} / 1 \text{ mol Na}_2\text{S}_2\text{O}_3) \\ = 9.14 \times 10^{101} \text{ mol}$$

8. How many atoms of Zn would contain the same number of grams as 7.54×10^{-6} mg of Cu?

$$7.54 \times 10^{-6} \text{ mg Cu} \times (10^{-3} \text{ g} / 1 \text{ mg}) = 7.54 \times 10^{-9} \text{ g Cu}$$

$$7.54 \times 10^{-9} \text{ g Zn} \times (1 \text{ mol Zn} / 65.4 \text{ g Zn}) \times (6.02 \times 10^{23} \text{ Zn atoms} / 1 \text{ mol Zn}) = 6.94 \times 10^{13} \text{ Zn atoms}$$