

Name: _____

20 Pts.

Chemistry Worksheet: The Mole and Conversions

1. Complete the table for the substances listed.

Substance	Mass	Moles	Number of Molecules or Formula Units	Volume at STP if a gas
C ₄ H ₁₀	15.0 g	0.259 mol	1.56×10^{23} molecules	5.79 L
K ₂ SO ₄ <small>174</small>	4.35 g	0.0250 mol	1.51×10^{22} f.u.	XXXXXX
UF ₆ <small>352</small>	1.8×10^4 g	51 mol	3.1×10^{25}	1.1×10^3 L
H ₂ S	6.09 g	0.179 mol	1.08×10^{23} molecules	4.00 dm ³

Change
UL
REVISE

2. Perform the following conversions. Report all answers with correct sig figs and units. Show work on a separate piece of paper.

- 0.448 mol 25.0 grams of Fe to moles
- 22 g 0.50 moles of CO₂ to grams
- $6.1 \times 10^{20} \text{ atoms}$ 2.0 x 10⁻¹ grams of Au to atoms
- 5.89 Liters 10.0g of F₂ gas at STP to Liters
- $2.458 \times 10^{24} \text{ molecules}$ 257.2 grams of HNO₃ to molecules
- 5.1 g 9.0 x 10²² molecules of PH₃ to grams
- 2.23 mol 50.0 dm³ of O₂ to moles
- $3.37 \times 10^{20} \text{ f.u.}$ 91.8 mg of Ca(NO₃)₂ to formula units
- $1.2 \times 10^{-6} \text{ mol}$ 7.1 x 10¹⁷ molecules of benzene to moles
- $8.60 \times 10^{22} \text{ molecules}$ 3.20 liters of propane gas to molecules

3 2. More Mole Investigations:

- a.) 0.00572 moles of an unknown substance composed of carbon, oxygen, sulfur, and hydrogen has a mass of 3.860 grams. What is its molecular mass?

$$675 \text{ g/mol}$$

- b.) What mass of magnesium is needed to equal the number of atoms that are contained in 5.00 grams of carbon?

$$10.1 \text{ g Mg}$$

$$0.417 \text{ mol C}$$

- c.) Avogadro's Principle: Tank A and B are identical (pressure, volume, and temperature). If tank A contains 2.0 x 10⁴ grams of oxygen gas, then how many grams of chlorine would be in tank B?

$$4.4 \times 10^4 \text{ g Cl}_2$$

$$625 \text{ moles}$$

- d.) How many **atoms** of gold are contained in 1.00 gram of the compound Au₂S₃?

$$0.00408 \text{ mol Au} = 2.48 \times 10^{21} \text{ atoms} \rightarrow 490 \text{ g/mol}$$