Eg. $4(12.01) = 4 \times 12.01 = 48.04$
$10(1.01) = 10 \times 1.01 = 10.10$ + ← add
58.14 g/mol ← units for Molar Mass

Lesson 16: The Mole

Fill in the missing values below:

	Formula	Name	Molar Mass
1	C_4H_{10} Data book P.5 ↖ Change to $C_4H_{10(g)}$	butane +1 −1	4C − 4(12.01) + 10H − 10(1.01) = 58.14 g/mol
2	$NaCl_{(aq)}$	Sodium chloride	1Na − 1(22.99) + 2Cl − 1(35.45) = 58.44 g/mol
3	$CH_{4(g)}$	methane	1C − 1(12.01) + 4H − 4(1.01) = 16.05 g/mol
4	$Mg(CN)_{2(s)}$	magnesium cyanide	1Mg − 1(24.31) 2C − 2(12.01) + 2N − 2(14.01) = 76.35 g/mol
5	2+ −1 MnO_2	Manganese (IV) oxide 4+ 2− 2+ 1−	1Mn − 1(54.94) 2O − 2(16.00) + = 86.94 g/mol
6	$Ca(NO_3)_{2(s)}$	calcium nitrate	1Ca − 1(40.08) 2N 2(14.01) + 6O 6(16.00) = 62.01 g/mol
7	omit	Nitrogen trioxide molecular compound	—
8	$KBr_{(s)}$	potassium bromide	1K − 1(39.10) 1Br − 1(79.90) = 119 g/mol
9	2+ 1− $NiCl_2$	Nickel (II) chloride 2+ 1−	1Ni − 1(58.69) 2Cl − 2(35.45) = 129.59 g/mol
10	$ZnCO_3$	zinc carbonate	1Zn − 1(65.41) 1C 1(12.01) 3O 1(16.00) = 125.42 g/mol

* Show all the work I am showing.

2. Fill in the missing information using the formula $n = \frac{m}{M}$ This is the formula for finding moles.

What is the formula for finding mass (g)?

$M \times n = \frac{m}{M} \times M$ → $m = n \times M$

n = moles → mol
m = mass → g
M = Molar mass → g/mol

a. Name: lithium carbonate (Li+ CO3 2-) Formula: ① $n = \frac{m}{M}$

Li_2CO_3 ② • Find M (g/mol) Mass: 25.0 g ← Calculate Moles (mol)

2 Li 2(6.94)
1 C 1(12.01)
3 O 3(16.00)
③ 73.89 g/mol

④ $n = \frac{m}{M}$

⑤ $n = \frac{25.0\ g}{73.89\ g/mol}$

⑥ $n = 0.338\ mol$ ← 3 significant digits

Given 25.0 g ⑥ 3 significant digits

b. Name: ① magnesium sulfate Formula: $MgSO_4$

② $MgSO_4$ • Find M (g/mol) Mass: 300 g ← Calculate Moles (mol)

1 Mg 1(24.31)
1 S 1(32.07)
4 O 4(16.00)
③ 120.38 g/mol

④ $n = \frac{m}{M}$

⑤ $n = \frac{300\ g}{120.38\ g/mol}$

⑥ $n = 2.49\ mol$ ← 3 significant digits

Given 300 g ⑥ 3 significant digits

c. Name: benzene ① Data booklet p. 5 Formula: ② $C_6H_6(l)$

C_6H_6 • Find M (g/mol) Moles: 1.50 mol ← Calculate mass (g)

④ 6 C 6(12.01)
6 H 6(1.01)
78.12 g/mol

⑤ $m = n \times M$

⑥ $m = 1.50\ mol \times 78.12\ g/mol$

⑦ $m = 117.18\ g$

⑧ $m = 117\ g$

Given 1.50 mol ⑧ 3 significant digits

d. Name: nickel (III) chloride (3+ 1−) Formula: ① $NiCl_3$

② $NiCl_3$ • Find M (g/mol) Moles: 2.5 mol **Calculate mass (g)**

③ 1 Ni 1(58.69)
3 Cl 3(35.45)
165.04 g/mol

④ $m = n \times M$

⑤ $m = 2.5\,mol \times 165.04\,g/mol$

⑥ $m = 412.6\,g$

Given 2.5 mol
⑥ 2 significant digits

will accept this answer →

2 significant digits - must write in Scientific Notation

412.6 ⑥ moved the decimal 2 places between the first + second number.

⑥ $m = 4.1 \times 10^2\,g$ ← 2 significant digits

e. Name: sodium oxalate Formula: $Na_2OOCCOO$

• Find M (g/mol) Mass: 500 g **Calculate Moles (mol)**

① 2 Na 2(22.99)
4 O 4(16.00)
2 C 2(12.01)
134 g/mol

② $n = \frac{m}{M}$

③ $n = \frac{500\,g}{134\,g/mol}$

④ $n = 3.73\,mol$

Given 500 g
3 significant digits

① ④+ −1

f) Name: ② tin (IV) hypochlorite Formula: $Sn(ClO)_4$

$Sn(ClO)_4$ • Find M (g/mol) Moles: 0.462 mol **Calculate mass (g)**

③

④ 1 Sn 1(118.71)
4 Cl 4(35.45)
4 O 4(16.00)
324.51 g/mol

⑤ $m = n \times M$

⑥ $m = 0.462\,mol \times 324.51\,g/mol$

⑦ $m = 149.923$ round up

⑧ $m = 150\,g$

Given:
0.462 mol
3 significant digits