

CHM 100
Chapter 8 Study Guide / Learning Objectives

Chapter 8 in your textbook deals with the mole concept. The mole is important in chemical calculations because (as a number of atoms) it relates directly to the coefficients in chemical equations. We discussed what a mole was, and how to relate it to the mass of a substance using formula weight. We also discussed how to determine the percentage composition by mass of a substance.

You are responsible for all the material in sections 8.1 through 8.6. Read the other sections, but don't worry about doing these calculations. I will not hold you responsible for the calculations in sections 8.7 - 8.9.

At the end of this chapter, you should be able to ...

[Terminology]

- Define terms related to the mass of atoms and molecules: **formula weight**, **molecular weight**.
- Define a **mole** and **molar mass**.
- Define **percentage composition**.

[Formula weight]

- Calculate the **formula weights** of **atoms**, **molecules**, or **ionic compounds** given the chemical formula and a periodic table.

[The mole]

- Calculate the **molar mass** of a compound. (*Hint: This is the same thing as calculating its formula weight*)
- Calculate the **moles of formula units in a given mass** of compound.
- Calculate the **grams of a compound necessary to have a given number of moles**.

[Percentage composition]

- Calculate the **percentage composition** of a compound given its chemical formula.
Example: What is the percentage of oxygen (by mass) in magnesium oxide, MgO?

[Practice]

- (p181a-181d) Q&P 10, 14, 20, 22, 28, 30, 34, 36, 38, 44, 46, 50
- A few extra practice problems are included with this study guide.

<i>Find the molar mass of ...</i>	<i>Answers</i>
MgCl ₂	95.21 g
Mg(NO ₃) ₂	148.33 g
Mg	24.31 g
C ₂ H ₄	28.05 g

<i>Find the number of moles in ...</i>	<i>Answers</i>
15.0 g MgCl ₂	0.158 mol MgCl ₂
173.5 g Mg(NO ₃) ₂	1.170 mol Mg(NO ₃) ₂
1.4x10 ³ g C ₂ H ₄	5.0x10 ¹ mol C ₂ H ₄
24.02 g C	2.000 mol C

<i>Find the mass of ...</i>	<i>Answers</i>
1.50 mol MgCl ₂	143 g MgCl ₂
0.0421 mol Mg(NO ₃) ₂	6.24 g Mg(NO ₃) ₂
4.215 mol Mg	102.5 g Mg
1.4x10 ⁻³ mol C ₂ H ₄	3.9x10 ⁻² g C ₂ H ₄ (0.039 g)

<i>What is the percentage composition by mass of ...</i>	<i>Answers</i>
Oxygen in MgO	39.7% O by mass
Fluorine in MgF ₂	61.0 % F by mass