



# Chemistry Connections to Our Changing World

## Worksheet on Basic Stoichiometry - Mole Chart

Refer to Chapter 10 in your text and answer the following questions.

### PART 1: Mole $\leftrightarrow$ Mass Conversions

Convert the following number of moles of chemical into its corresponding mass in grams.  
(Sig. figs. count in your final answer.)

- 0.436 moles of ammonium chloride
- 2.360 moles of lead (II) oxide
- 0.031 moles of aluminum iodide
- 1.077 moles of magnesium phosphate
- 0.50 moles of calcium nitrate

Convert the following masses into their corresponding number of moles.  
(Sig. figs. count in your final answer.)

- 23.5 g of sodium chloride
- 0.773 g of sodium cyanide
- 0.250 g of water
- 169.45 g of calcium acetate
- 79.9 g of potassium permanganate

### PART 2: Moles $\leftrightarrow$ Number of Particles Conversions

Convert the following number of moles into their corresponding number of particles.  
(Sig. figs. count in your final answer.)

- 0.0455 moles of hydrochloric acid
- 1.2 moles of glucose ( $C_6H_{12}O_6$ )
- 0.32 moles of sodium bicarbonate

Convert the following number of particles into their corresponding number of moles.  
(Sig. figs. count in your final answer.)

- $6.99 \times 10^{24}$  molecules of sodium nitrite
- $1.255 \times 10^{25}$  molecules of magnesium chloride
- $7.2 \times 10^{23}$  atoms of helium
- How many **atoms** of **oxygen** are there in 2.35 moles of sodium phosphate?
- How many **atoms** of **carbon** are there in 0.0022 moles of lead (IV) acetate?
- How many **moles** of **oxygen atoms** are there in  $2.55 \times 10^{24}$  molecules of sodium nitrate?
- How many **moles** of **hydrogen atoms** are there in  $1.046 \times 10^{23}$  molecules of ammonium hydroxide?

### PART 3: Moles ↔ Molarity Conversions

Convert the following number of moles into their corresponding molarities.

21. 0.694 moles of sodium hydroxide in 400. mL      22. 1.25 moles of magnesium borate in 2.5 L  
23. 0.0039 moles of lead (II) chloride in 25 mL

Convert the following molarities into their corresponding number of moles.

24. 500. mL of 1.25 M sodium oxide      25. 250. mL of 0.75 M magnesium fluoride  
26. 100. mL of 1.10 M calcium nitrate

### PART 4: Moles ↔ Litres of gas (at standard conditions STP) Conversions

Convert the following number of moles into their corresponding volumes of gas.

27. 2.2 moles of hydrogen gas      28. 0.0665 moles of oxygen gas  
29. 30.7 moles of sulfur dioxide gas

Convert the following volumes of gas into their corresponding number of moles.

30. 50.0 L of oxygen gas      31. 2.75 L of chlorine gas  
32. 1000. mL of carbon dioxide gas

### PART 5: Mixed Problems involving multiple conversions

Convert the following masses into their corresponding molarities.

33. 50.0 g of sodium hydroxide in 1.2 L      34. 100. g of magnesium nitrate in 500. mL  
35. 75.45 g of calcium sulfate in 300. mL      36. 10.1 g of sodium chlorite in 100. mL

Convert the following molarities into their corresponding masses.

37. 1.2 L of 0.400 M sodium carbonate      38. 450. mL of 1.35 M iron (III) nitrate  
39. 250. mL of 0.095 M copper (II) sulfate      40. 5.00 L of 1.15 M zinc nitrate

How many grams are there in the following volumes of gas (at STP)?

41. 45.25 L of carbon dioxide      42. 2.8 L of carbon disulfide  
43. 50.0 L of nitrogen      44. 2000. L of carbon monoxide

What are the volumes of the following masses of gas?

45. 50.0 g of oxygen      46. 3.50 kg of argon  
47. 700. g of nitrogen monoxide      48. 500. g of sulfur trioxide  
49. 50.0 L of carbon dioxide gas will contain how many molecules of the gas?  
50. How many atoms of oxygen are contained in question #49?