



CHEMISTRY

AVOGADRO and THE MOLE

The Mole - A Unit of Measure

When you get a group of things together, people have come up with names to describe the amount. These names are called units. For example:



12 eggs = 1 **dozen**
24 eggs = 2 **dozen**

365 days = 1 **year**
1461 days = 4 **years**

**The Definition of the Mole**

Convenient, or easily measurable, amounts of elements contain huge numbers of atoms. Therefore, chemists use a quantity that is much larger than a dozen or a year to group atoms or molecules together. This quantity is the **mole** (symbol **mol**)

- One mole (**1 mol**) of a substance contains **6.022×10^{23}** particles.
- This value is called **Avogadro's constant (N_A)**.

For example:

1 mol of Carbon contains 6.022×10^{23} atoms of Carbon.

1 mol of NaCl contains 6.022×10^{23} molecules of Sodium Chloride.

1 mol of loonies contains $\$6.022 \times 10^{23}$

**CHEMISTRY****AVOGADRO and THE MOLE**Thought Experiment

What is the mass of 1 mol of Watermelons?
How does this compare to the mass of the Earth?

Givens:

$$m_{(\text{watermelon})} = 5 \text{ kg}$$

$$m_{(\text{Earth})} = 5.9742 \times 10^{24} \text{ kg}$$



CHEMISTRY

AVOGADRO and THE MOLE

Converting Moles to Number of Particles

| | |
|--|-----------------------------|
| | N = Number of Particles |
| | n = number of moles |
| | N_A = Avogadro's constant |

Ex. 1: Calculate the number of particles in 2 mol of calcium

Ex. 2 a) Calculate the number of molecules in 3.5 mol of carbon dioxide

b) Calculate the number of atoms in 3.5 mol of carbon dioxide

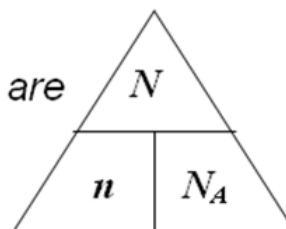


CHEMISTRY

AVOGADRO and THE MOLE

Converting Number of Particles to Moles**Converting Number of Particles to Moles**

Ex. 1: Calculate the number of moles there are in 1.5055×10^{24} molecules.



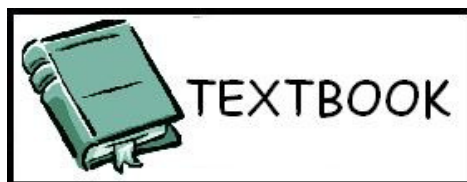


CHEMISTRY

AVOGADRO and THE MOLE

Homework

Pg. 230 - 231 #11 - 30



<http://www.gecdsb.on.ca/schools/sec/brdhs/caslick/sch3utext.html>