

Mole Practice

Name: _____

Date: _____

Avogadro's Number (6.02×10^{23}) was not discovered by him, but named in honor of him. It was Dr. Avogadro's original hypothesis about the volume of gas molecules that led to the development of the mole concept many years later.



The only known picture of
Amedeo Avogadro

Use your newfound molar repertoire to complete the following problems:

- 1) What is the mass of 5.7 L of NH_3 (g) at STP?
- 2) How many molecules are in 75.0 g of diphosphorus pentoxide?
- 3) What is the mass of 2.5 moles of Cl_2 (g) at STP?
- 4) What volume is occupied by 55 g of methane, CH_4 (g) at STP?
- 5) How many atoms of neon gas would a container with a volume of 67.2 L hold at STP?
- 6) Change 5.20 moles of $\text{C}_3\text{H}_6\text{O}_2$ to grams.
- 7) Change 13.2 g of $\text{Fe}(\text{NO}_3)_3$ to moles.
- 8) Change 13.2 g of $\text{Sn}(\text{CO}_3)_2$ to moles.
- 9) How many molecules of ammonium chloride are in 54.5 g of ammonium chloride?

Q: What did Avogadro teach his students in math class?
A: *Moletiplication!*

10) One drop of water weighs 0.040 g. How many molecules are there in one drop, taking the gram formula mass (molar mass) of water to be 18 g/mol?

11) Isopentyl acetate, $C_7H_{14}O_2$, the compound responsible for the scent of bananas, can be produced commercially. Interestingly, some bees release about 1 μg (1×10^{-6} g) of this compound when they sting. It is believed the resulting scent attracts other bees to join the attack. How many molecules of isopentyl acetate are released in a typical bee sting?

12) How many moles are there in 303 g of potassium nitrate? How many molecules are there?

13) A silicon chip used in an integrated circuit of a microcomputer has a mass of .006 g. How many silicon (Si) atoms are present in the chip?

Amedeo Avogadro Fun Facts!

- He was born in 1776; one month after the Declaration of Independence was signed.
- He received a degree in law at the age of 16.
- He had 6 children. (Yes, he was married, although his picture would make you think otherwise.)
- He was a chemistry professor at the University of Turin, which still exists in the city where the Winter Olympics were recently held.