



# What is a Mole?

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8<sup>th</sup> Grade Science



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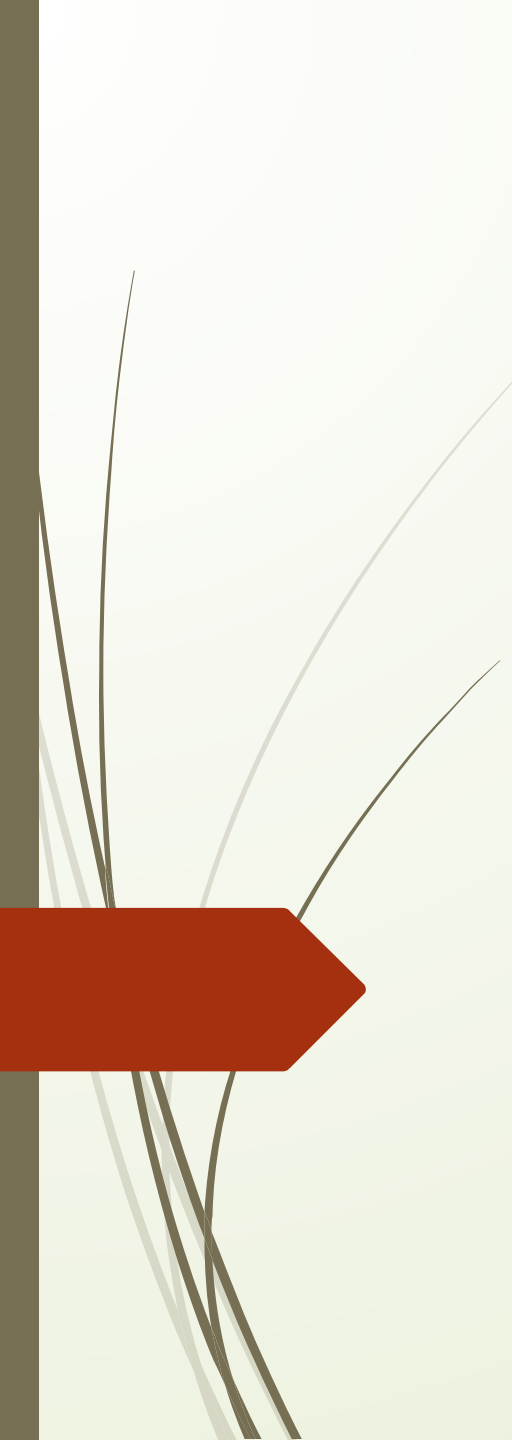
- In chemistry, a mole (abbreviated as “mol”) is a unit of measurement.
- 1 mole =  $6.02 \times 10^{23}$  particles



Where did the concept of mole  
come from?

□ Number of particles in 1 mole,  
or  $6.02 \times 10^{23}$  = Number of atoms in 1  
mole of Carbon-12

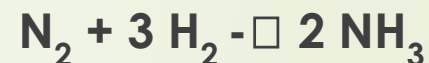
[Video: "Concept of Mole - Avogadro's Number"](#)



The following examples  
are for 8 Honors Only.  
These are problems 7 and  
8 on section 7.1

CP students are welcome to look and follow along but are not responsible for slides 5 and 6.

# Calculating with Moles



How many moles of  $\text{NH}_3$  can be made if 7.5 moles of  $\text{H}_2$  react with enough  $\text{N}_2$ ?

□ **Step 1: Write out what's given to you:**

□ Given: 7.5 moles of  $\text{H}_2$  is available.

□ **Step 2: Write out what is asked/wanted:**

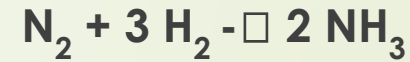
□ Want: Moles of  $\text{NH}_3$  produced for every 7.5 moles of  $\text{H}_2$ ?

□ **Step 3: Do the math, using ratios in the balanced chemical reaction.**

□  $7.5 \text{ Moles H}_2 \times \frac{2 \text{ Mole NH}_3}{3 \text{ Mole H}_2} = 5.0 \text{ moles of NH}_3$

# Calculating with Moles

What mass of  $\text{NH}_3$  can be made from 35 grams of  $\text{N}_2$ ?



□ **Step 1: Write out what's given to you:**

Mass of  $\text{N}_2$  is available = 35 grams

□ **Step 2: Write out what is asked:**

Mass of  $\text{NH}_3$  produced from 35 grams of  $\text{N}_2$ ?

□ **Step 3: Do the math, keeping in mind what is asked.**

a) First, you need to convert grams of  $\text{N}_2$  to moles, since your ratios in the chemical equation are in moles.

$$35 \text{ grams of } \text{N}_2 \times \frac{1 \text{ Mole } \text{N}_2}{28 \text{ grams of } \text{N}_2} = 1.25 \text{ moles of } \text{N}_2$$

b) Next compare moles of  $\text{N}_2$  available to the ratio of  $\text{NH}_3$  to  $\text{N}_2$

$$1.25 \text{ Moles of } \text{N}_2 \times \frac{2 \text{ moles } \text{NH}_3}{1 \text{ mole } \text{N}_2} = 2.50 \text{ Moles } \text{NH}_3$$

c) Lastly, they want the response in mass, so convert 2.50 Moles  $\text{NH}_3$  to grams  $\text{NH}_3$  because we are asked for mass, not moles.

$$2.50 \text{ moles of } \text{NH}_3 \times \frac{17 \text{ grams } \text{NH}_3}{1 \text{ mole } \text{NH}_3} = \mathbf{42.5 \text{ grams of } \text{NH}_3}$$