

THE MOLE

Directions: Solve each problem below. Be sure you show your work.

One Mole = 6.022×10^{23} particles	
$\begin{array}{c} 6 \\ \mathbf{C} \\ \text{carbon} \\ 12.011 \end{array}$	<i>atomic number = 6</i> <i>mass number = 12</i> <i>atomic mass = 12.011 amu</i> <i>molar mass = 12.011 g</i>
<p>Example 1: How many atoms are in 2.5 moles of titanium? <i>(2.5 moles) (6.022 x 10²³ atoms/1mole) = 1.5 x 10²⁴ atoms of Ti</i></p> <p>Example 2: How many grams are in 3.50 moles of iron? <i>(3.50 moles)(55.85g of Fe/1mole of Fe) = 195.5 g of Fe</i></p>	

1. How many atoms are in 1.8 moles of sodium? *1.1 x 10²⁴ atoms*
(1.8moles) (6.022 x 10²³ atoms/1mole)
2. How many atoms are in 5.4 moles of silver? *3.3 x 10²⁴ atoms*
(5.4moles) (6.022 x 10²³ atoms/1mole)
3. If there exist 1.81×10^{24} atoms of gold, how many moles are present? *3 moles*
(1.81 x 10²⁴ atoms)/(1mole/6.022 x 10²³ atoms)
4. If there exist 1.5×10^{23} atoms of bismuth, how many moles are present? *0.25moles*
(1.5 x 10²³ atoms)/(1mole/6.022 x 10²³ atoms)
5. How many grams are in 0.75 moles of radon? *166.52g*
(0.75moles)(222.02g of Rn/1mole of Rn)
6. How many grams are in 1.5 moles of helium? *6.0g*
(1.5moles)(4.00g of He/1mole of He)
7. Determine the amount (in moles) of tin present in 352 g of tin? *2.97 moles*
(352 g of Sn)/(1mole of Sn/118.710g of Sn)
8. Determine the amount (in moles) of carbon present in 241 g of carbon? *20.01 moles*
(241 g of C)/(1mole of C/12.011g of C)
9. If there exist 1.20×10^{23} atoms of lithium, how many grams are present? *1.38g*
(1.20 x 10²³ atoms)(1mole/6.022 x 10²³ atoms)(6.941g of Li/1mole of Li)
10. If there exist 3.31×10^{24} atoms of phosphorous, how many grams are present? *170.25g*
(3.31 x 10²⁴ atoms)(1mole/6.022 x 10²³ atoms)(30.974g of P/1mole of P)