

Name KEY

Avogadro's number =  $6.022 \times 10^{23}$

One dozen = 12

A mole is  $6.022 \times 10^{23}$  of anything. If you have a mole of marbles then you have  $6.022 \times 10^{23}$  marbles. If you have one mole of pencils, then you have  $6.022 \times 10^{23}$  pencils.

1. If you have two dozen donuts, how many donuts do you have? 24 donuts
2. If you have two moles of donuts, how many donuts do you have?  
 $6.022 \times 10^{23} \times 2 = 1.2 \times 10^{24}$  donuts
3. If you have a half-dozen jellybeans, how many jellybeans do you have? 6 jelly beans
4. If you have half a mole of jellybeans, how many jellybeans do you have?  
 $3 \times 10^{23}$  jellybeans
5. If you have 24 gold atoms, how many dozen gold atoms do you have? 2 dozen gold atoms
6. If you have  $12.044 \times 10^{23}$  atoms of gold, how many moles of gold do you have? 2 moles gold atoms
7. If you have 6 atoms of silver, how many dozen silver atoms do you have?  $\frac{1}{2}$  dozen or .5 dozen
8. If you have  $3.011 \times 10^{23}$  atoms of silver, how many moles of silver do you have?  $\frac{1}{2}$  mol or .5 mol silver
9. If you have one dozen cars, how many wheels would you have? 48 wheels
10. If you have one mole of cars, how many wheels would you have?  
 $6.022 \times 10^{23} \times 4 = 2.4 \times 10^{24}$  wheels
11. The formula for methane gas is  $\text{CH}_4$ . How many atoms are in one molecule of methane? 5
12. Is methane an element or a compound?
13. How many different kinds of elements is methane composed of? 2
14. How many carbon atoms are in one molecule of methane? 1
15. How many carbon atoms are in one mole of methane?  $6.022 \times 10^{23}$  C atoms
16. How many hydrogen atoms are in one molecule of methane? 4
17. How many hydrogen atoms are in one mole of methane?  $6.022 \times 10^{23} \times 4 = 2.4 \times 10^{24}$  H atoms
18. How many methane molecules are in one mole of methane?  
 $6.022 \times 10^{23}$   $\text{CH}_4$  molecules

Grams/moles/atoms

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Key

1. If you have 4.3 grams of potassium (K), how many **moles** of potassium do you have?

$$\frac{4.3 \text{ g K}}{39.098 \text{ g K}} \times \frac{1 \text{ mol K}}{1 \text{ mol K}} = 0.11 \text{ mol K} \quad 2 \text{ sig. figs.}$$

2. If you have 2.8 moles of K, how many **grams** of K do you have?

$$\frac{2.8 \text{ mol K}}{1 \text{ mol K}} \times \frac{39.098 \text{ g K}}{1 \text{ mol K}} = 109.47 \quad 2 \text{ sig. figs.}$$

110g

3. If you have  $6.1 \times 10^{25}$  atoms of K, how many **moles** of K do you have?

$$\frac{6.1 \times 10^{25} \text{ atoms K}}{6.022 \times 10^{23} \text{ atoms K}} \times \frac{1 \text{ mol K}}{1 \text{ mol K}} = 101.29 \quad 2 \text{ sig. figs.}$$

$1.0 \times 10^2$  moles K

4. If you have 5.5 moles of K, how many **atoms** of K do you have?

$$\frac{5.5 \text{ moles K}}{1 \text{ mole K}} \times \frac{6.022 \times 10^{23} \text{ atoms K}}{1 \text{ mole K}} = 3.3 \times 10^{24} \text{ atoms}$$

5. If you have 3.2 grams of K, how many **atoms** of K do you have?

$$\frac{3.2 \text{ g K}}{39.098 \text{ g K}} \times \frac{1 \text{ mol K}}{1 \text{ mol K}} \times \frac{6.022 \times 10^{23} \text{ atoms K}}{1 \text{ mol K}} = 4.9 \times 10^{22} \text{ atoms K} \quad 2 \text{ sig. figs.}$$

6. If you have  $7.2 \times 10^{21}$  atoms of K, how many **grams** of K do you have?

$$\left( \frac{7.2 \times 10^{21} \text{ atoms K}}{6.022 \times 10^{23} \text{ atoms K}} \right) \times \left( \frac{39.098 \text{ g K}}{1 \text{ mol K}} \right) = 0.47 \text{ g K} \quad 2 \text{ sig. figs.}$$

7. If you have 5.9 grams of sodium (Na), how many **moles** of sodium do you have?

$$\frac{5.9 \text{ g Na}}{22.990 \text{ g Na}} \times \frac{1 \text{ mol Na}}{1 \text{ mol Na}} = 0.26 \text{ mol Na}$$

8. If you have 1.3 grams of sodium, how many **atoms** of sodium do you have?

$$\frac{1.3 \text{ g Na}}{22.990 \text{ g Na}} \times \frac{1 \text{ mol Na}}{1 \text{ mol Na}} \times \frac{6.022 \times 10^{23} \text{ atoms Na}}{1 \text{ mol Na}} = 3.4 \times 10^{22} \text{ atoms Na}$$