

### Mass, Moles, Atoms Worksheet

1. What is the molar mass of ammonium sulfate?
2. What is the molar mass of cobalt(II) iodide hexahydrate?
3. Calculate the number of moles in 0.41 g of titanium.
4. What is the mass of  $1.0 \times 10^9$  carbon atoms?
5. The density of carbon tetrachloride is 1.59 g/mL. How many Cl atoms are present in 55 mL of carbon tetrachloride?
6. The molar mass of cesium is 132.9 g/mol. What is the mass of a single Cs atom?
7. The density of lithium is 0.546 g/cm<sup>3</sup>. What volume is occupied by  $1.96 \times 10^{23}$  atoms of Li?
8. What is the mass percentage of oxygen in acetic acid,  $\text{HCH}_3\text{CO}_2$ ?
9. Which of the following could be an empirical formula?  $\text{C}_6\text{H}_{10}$ ,  $\text{B}_4\text{H}_{10}$ ,  $\text{NO}_3$ ,  $\text{AsCl}_5$ .
10. Benzene has an empirical formula of CH. If the molar mass of benzene is 78.11 g/mol, what is the molecular formula for benzene?
11. Toluene is 91.25% C and 8.75% H. Determine the empirical formula for toluene.  
*Hint:  $8/7 = 1.14$*
12. The compound azulene is 93.71% C with the remainder hydrogen, and it has a molar mass of 128.16 g/mol. Calculate the empirical formula and molecular formula for azulene. *Hint:  $5/4 = 1.25$*

*Answers appear on the next page*

### Mass, Moles, Atoms Worksheet - *Answers*

1. 132.1 g/mol
2. 420.8 g/mol
3.  $8.6 \times 10^{-3}$  mol
4.  $2.0 \times 10^{-14}$  g
5.  $1.4 \times 10^{24}$  atoms
6.  $2.207 \times 10^{-22}$  g
7. 4.14 cm<sup>3</sup>
8. 53.29%
9. NO<sub>3</sub> and AsCl<sub>5</sub> could be empirical formulas.
10. C<sub>6</sub>H<sub>6</sub>
11. C<sub>7</sub>H<sub>8</sub>
12. C<sub>5</sub>H<sub>4</sub> (EF) and C<sub>10</sub>H<sub>8</sub> (MF)