

Formula Mass

Compounds are either ionic or molecular. The formulas for ionic substances are always written with subscripts reduced to lowest terms. This is because we know the ratio of ions in a compound, but we don't necessarily know how many ions are in a crystal of the compound. Formulas written in lowest terms are called empirical formulas. Molecular substances can have formulas that are not in lowest terms. For example, the formula of glucose is $C_6H_{12}O_6$. All of the subscripts are divisible by six. This is acceptable, however, because we know exactly how many atoms of each type are in a molecule of glucose. The formula for glucose is called a molecular formula and its mass is called a molecular mass. Regardless of whether a compound has a molecular formula or an empirical formula, the mass of the compound is found the same way. The atomic masses of the elements in the compound and the formula are used to determine the mass. The mass determined from the formula is called a formula mass. A molecular mass is a type of formula mass. The terms are sometimes used interchangeably. Formula masses are determined by following the steps in the box to the right. The results are in *atomic mass units* (amu).

Finding the Formula Mass

Find the formula mass of $CuSO_4$

Step 1: Look up the mass of each element on the *Periodic Table* and round it off.

Step 2: Multiply each element's atomic mass by its subscript to get the product.

Step 3: Add the products together to get the total

Element	Atomic Mass		Subscript	=	Product
Cu	64	×	1	=	64
S	32	×	1	=	32
O	16	×	4	=	64
<i>TOTAL</i>					160

Determine the formula masses of each of the substances below.

