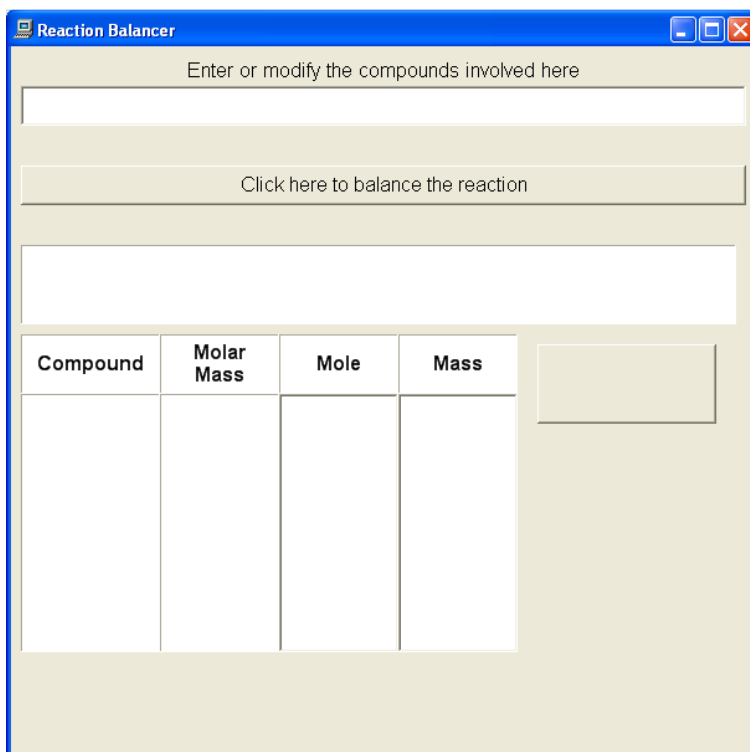


# Reaction Balancer

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This is a calculator that balances chemical reactions. You're most welcome to download and use it, but please understand that it comes with no warranty whatsoever. Arithmetek Inc. accepts no liability whatsoever for its use, any errors, any consequences of using it, nor for any inability to use this calculator.

Having said that, I have found it a useful little tool at times, especially when I don't feel like figuring out stoichiometric coefficients myself, or when I need to calculate quantities of reagents, products, etc. from other input numbers. If you want it, just copy the zip file, save it somewhere convenient on your computer, extract the executable file and save it as something you'll recognize again. This is what it looks like when you first open it.



Compound	Molar Mass	Mole	Mass

All you do is type the reactants and products you want into the upper box, separating them with blanks, commas or semi-colons. The elements do need to be put in correctly – it is case sensitive. (It'll work anyway sometimes, but if you put in FE or fe instead of Fe, for example, it'll give an error message.) It accepts brackets in formulas for individual compounds, but you do need to make sure that you've done them correctly. You also need to give it the correct compounds to balance – it doesn't check for consistency in the individual components. Here's an example of incorrectly entered input data. In this case, ferric sulphate is entered incorrectly. The next picture shows it done correctly.

Reaction Balancer

Enter or modify the compounds involved here

Fe SO4 Fe(SO4)2

Click here to balance the reaction

The reaction matrix was solved, but the overall mass balance failed. Are all the compounds listed correct?

Compound	Molar Mass	Mole	Mass

Reaction Balancer

Enter or modify the compounds involved here

Fe SO4 Fe2(SO4)3

Click here to balance the reaction

$2\text{Fe} + 3\text{SO}_4 = \text{Fe}_2(\text{SO}_4)_3$

Compound	Molar Mass	Mole	Mass
Reactants			
Fe	55.847	2.000	111.694
SO4	96.064	3.000	288.191
Products			
Fe2(SO4)3	399.885	1.000	399.885

Re-calculate

Changing any one value in the Mole or Mass column and clicking re-calculate bases the values in both columns on the number changed

Reactant mass : 399.885  
Product mass : 399.885

In this example, I wanted to balance the reaction between iron and sulphate to get ferric sulphate. To make it ferrous sulphate instead, just change  $\text{Fe}_2(\text{SO}_4)_3$  to  $\text{FeSO}_4$ , as I've done in the next picture. You do need to know the chemistry you're calculating, as the calculator doesn't know whether it's been given  $\text{Fe}^{3+}$  or  $\text{Fe}^{2+}$  in this example – it only recognizes the element Fe.

Reaction Balancer

Enter or modify the compounds involved here

Fe SO4 FeSO4

Click here to balance the reaction

Fe + SO4 = FeSO4

Compound	Molar Mass	Mole	Mass
Reactants			
Fe	55.847	1.000	55.847
SO4	96.064	1.000	96.064
Products			
FeSO4	151.911	1.000	151.911

Re-calculate

Changing any one value in the Mole or Mass column and clicking re-calculate bases the values in both columns on the number changed

Reactant mass : 151.911  
Product mass : 151.911

Once you've entered the various compounds properly and the calculator has balanced the reaction, there's a useful feature that allows you to change any number in the products or reagents and it'll recalculate the other numbers accordingly. In the next example I've used a reaction between water, sulphur dioxide and oxygen, giving sulphuric acid.

Reaction Balancer

Enter or modify the compounds involved here

H2O SO2 O2 H2SO4

Click here to balance the reaction

H2O + SO2 + 0.5O2 = H2SO4

Compound	Molar Mass	Mole	Mass
Reactants			
H2O	18.015	1.000	18.015
SO2	64.065	1.000	64.065
O2	31.999	0.500	15.999
Products			
H2SO4	98.079	1.000	98.079

Re-calculate

Changing any one value in the Mole or Mass column and clicking re-calculate bases the values in both columns on the number changed

Reactant mass : 98.079  
Product mass : 98.079

You'll notice that, in the column headed Mole it lists the reactants as one molar unit of water, one of sulphur dioxide and half a molar unit of oxygen, giving one molar unit of sulphuric acid. In the column headed Mass it gives the same quantities, just as mass values. The molar values are all well and good, but if I wanted to make a ton of acid and had to buy the sulphur dioxide, water and oxygen, those being priced per kilogram, I'd want to have the masses of reagents in kilograms, per ton of acid. No problem, I simply change the number 98.079 in the Mass column to 1000 and click the re-calculate button.

Enter or modify the compounds involved here

H2O SO2 O2 H2SO4

Click here to balance the reaction

H2O + SO2 + 0.5O2 = H2SO4

Compound	Molar Mass	Mole	Mass
Reactants			
H2O	18.015	10.196	183.680
SO2	64.065	10.196	653.193
O2	31.999	5.098	163.127
Products			
H2SO4	98.079	10.196	1000.000

Re-calculate

Changing any one value in the Mole or Mass column and clicking re-calculate bases the values in both columns on the number changed

Mass in : 1000.000      Mass out : 1000.000

I have occasionally put in compounds that should be OK but the calculator thinks there's something wrong. The next picture shows example. (I used three blanks between each compound this time.)

In this example the calculator didn't read the component  $\text{H}_3\text{OFe}_3(\text{SO}_4)_2(\text{OH})_6$  correctly. One day I'll get around to fixing that, but in all honesty it's not a high priority. If you're any good at C# and would like a go at it, please contact me and I'll give you the source code.

The picture after that shows an example in which there are not enough compounds for the equation to balance. I left out the sulphur dioxide.

The last picture shows an example in which I have too many compounds.

There you are. Keep your brain switched on when you use this calculator – it works quite well most of the time, but it is only a dumb algorithm...

Mike Dry.

Reaction Balancer

Enter or modify the compounds involved here

H2O Fe SO4 H3OFe3(SO4)2(OH)6 H3O

Click here to balance the reaction

Element S appears only in SO4. It must appear in at least two of the compounds listed.

Compound	Molar Mass	Mole	Mass

Reaction Balancer

Enter or modify the compounds involved here

H2O O2 H2SO4

Click here to balance the reaction

Element S appears only in H2SO4. It must appear in at least two of the compounds listed.

Compound	Molar Mass	Mole	Mass

Reaction Balancer

Enter or modify the compounds involved here

H2O O2 SO2 SO3 H2SO4

Click here to balance the reaction

The 5 compounds listed contain only 3 different atoms.  
You need at least 4 atoms to balance a reaction of 5 compounds.

Compound	Molar Mass	Mole	Mass

