

Thread NSTA Chemical reactions

Hi! I am currently working with my 8th grade students and would like to do some SIMPLE lab activities to show the different types of chemical reactions (single, double, synthesis, decomposition) Any ideas?

Debbie Johnson

<http://johnson.emcs.net>

Teacher response thread:

I have to question why you are asking 8th graders to classify types of chemical reactions, which is a typical 10-11th grade chemistry class question. I understand from AAS and NRC that in middle school students should be able to distinguish between physical and chemical reactions, but I don't see anything on differentiating types of reactions. If you want to spend time on reaction types, how about focusing on combustion: introduce the "fire triangle" & talk about fire safety, then relate fires to corrosion and cellular respiration in their mutual need for oxygen.

That said, mixing solutions of calcium chloride (sold as "Sno-Go" in the northeast) and sodium carbonate ("washing soda") produces a solid precipitate of chalk (calcium carbonate) plus a solution of saltwater ... a very safe double replacement reaction. And putting steel wool (essentially pure iron) into a blue solution of copper sulfate (available in garden stores) will produce a single replacement reaction to produce a precipitate of copper plus a clear solution of iron sulfate. This can also be done with aluminum foil and copper chloride: the reaction is faster and generates noticeable heat, as I recall.

Susan A. Klemmer

Chair, Science Department

Camden Hills Regional High School

25 Keelson Drive, Rockport, ME 04856

Search for "chemistry that applies" and you'll find a link to a pdf of some lessons that focus on those different kinds of reactions. I've used them with my 8th graders.... they use:
butane lighter

vinegar and baking soda
decomposition of water
rusting of iron

the lessons don't talk particulars about the types of reactions, but I'm sure you could add that in.

I like to use H₂ and O₂ here, because it lets students observe both decomposition AND synthesis, using the same elements. Sort of a "making a cake" (synthesis) and "un-making a cake (decomposition)".

H₂O₂ --> H₂O + O₂ (pick your catalyst here...KI, KMnO₄, yeast, liver, etc.) Burning splint test to check for O₂

H₂ + O₂ --> H₂O (H₂ in a balloon, O₂ from the air, light with a meterstick-candle).

Unfortunatley, these can be confusing for students. The idea of a catalyst needs to be very clear. Also, since the balloon is only H₂, some students aren't sure where the O₂ comes from. But I think with enough diagramming and pre-post demo instruction, it should work fine.

Have fun. I think it's great to expose 8th graders to something more advanced then physical vs. chemical.

Ryan Lenz