Welcome to the wonderful world of chemicals! To start us off, I believe it would be beneficial to review the basics.

In summary, chemistry depends on the interactions of molecules, which depends on the structures and properties of said molecules, which depends on the movement and properties of atoms, which depends on...

Er, maybe it'd be better to just start with atoms...

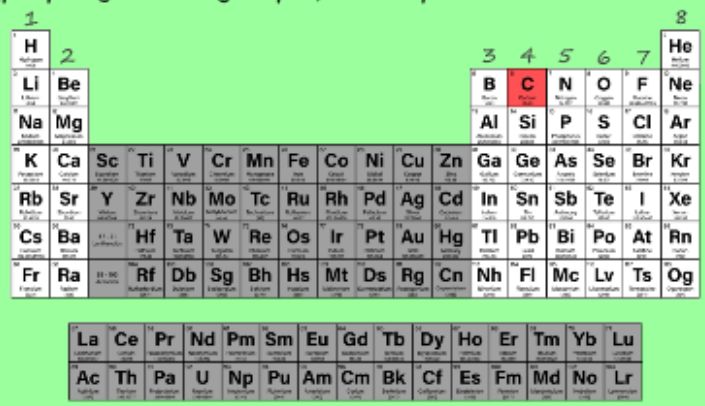
An atom consists of positively charged protons and neutral neutrons, both found in the nucleus, which is surrounded by negatively charged electrons.

This is your typical carbon atom.

See how there are two rings of electrons? In chemistry, we mostly care about the outer ring, called the

~ valence shell ~

The number of valence electrons is determined* by looking at the columns (properly called "groups") of the periodic table.



As you can see, carbon (in red) is in group 4 and, so, has 4 valence electrons.

* does not apply to the gray section

The reason we care about valence electrons so much is because they take part in reactions, while the rest are shielded off (generally).

This is because (generally) every atom wants to have 8 valence electrons, and this desire drives them to bond with other atoms.

In other words, a happy atom has 8 valence electrons, but that's not all...

An atom also wants to a neutral formal charge.

$$\text{formal charge} = \left(\begin{array}{c}\#\text{ of}\\ \text{bonds}\end{array} + \begin{array}{c}\text{unbonded}\\ \text{electrons}\end{array}\right) - \begin{array}{c}\#\text{ of}\\ \text{valence}\end{array}$$

So, for example, in this carbon monoxide molecule:

$:C \equiv O:$

the carbon's formal charge would be:

$(3 + 2) - 4 = -1$

and oxygen's formal charge would be:

$(3 + 2) - 6 = +1$

therefore, the overall charge is:

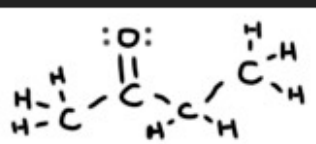
$1 - 1 = 0$

Happy molecules are boring - case in point, the noble gases, which naturally have all 8 valence electrons and, so, are (generally) unreactive. Luckily for chemists, however, what really matters isn't the overall charge of the molecule, but rather what's going on inside and around it.

As long as there are any sources of spare electrons at all (unbonded pairs or double / triple bonds), the molecule is sure to be reactive.

Ah, there's one last thing I forgot to mention... Chemists can be kind of lazy sometimes and tend to leave a lot of necessary information implied, rather than explictly stated.

Specifically, carbons are simply shown as intersections between bonds and hydrogens and lone pairs are ignored.

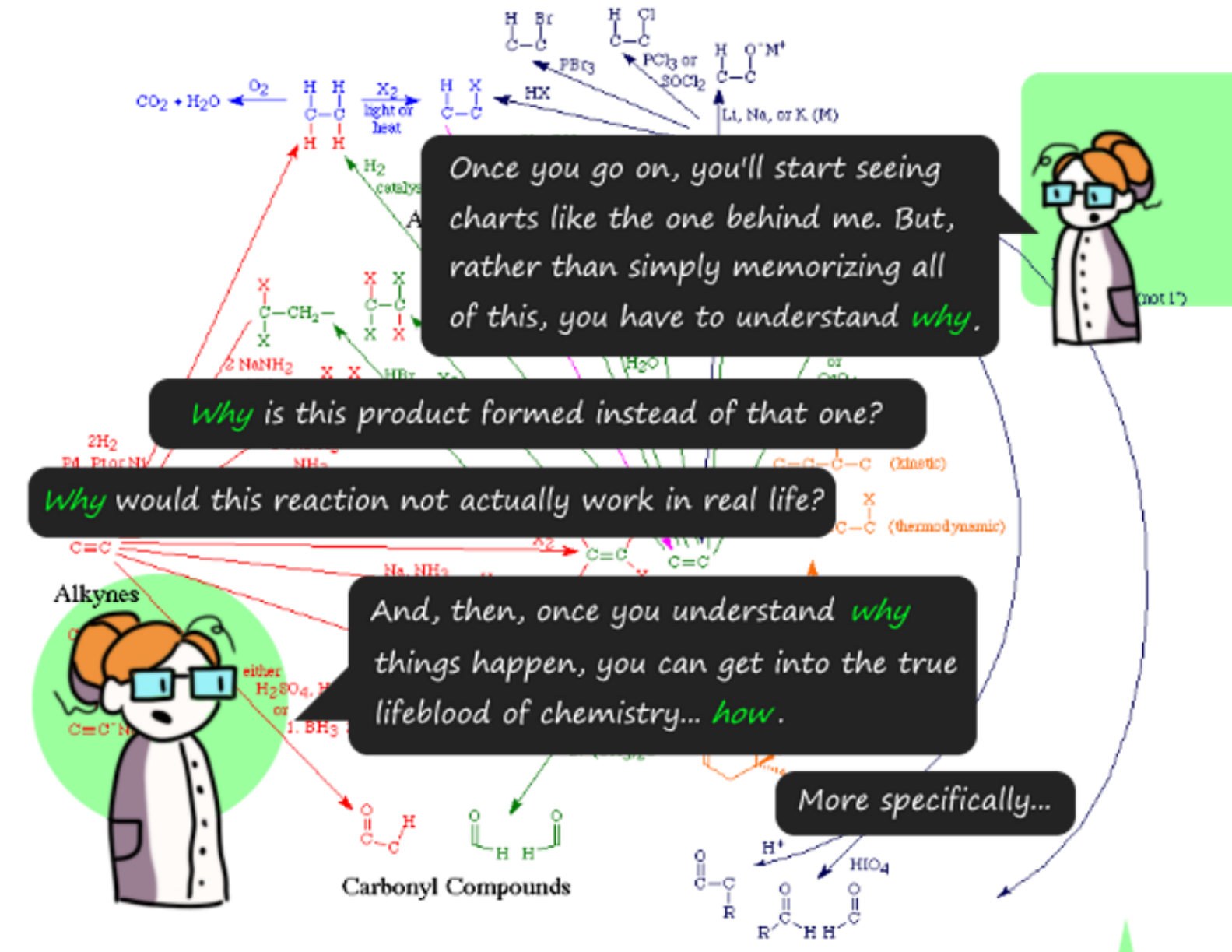
So,  becomes 

Now...

We can get to the fun part!

While introductory classes like this one tend to just consist of definitions with a few equations mixed in, you have to realize...

Chemistry isn't just a plug & chug sorta field. And, unlike what some say, it doesn't just involve rote memorization, either.



Once you go on, you'll start seeing charts like the one behind me. But, rather than simply memorizing all of this, you have to understand *why*.

Why is this product formed instead of that one?

Why would this reaction not actually work in real life?

And, then, once you understand *why* things happen, you can get into the true lifeblood of chemistry... *how*.

How can we take the fundamental forces that form our universe...

AND BEND THEM TO OUR WILL!! *

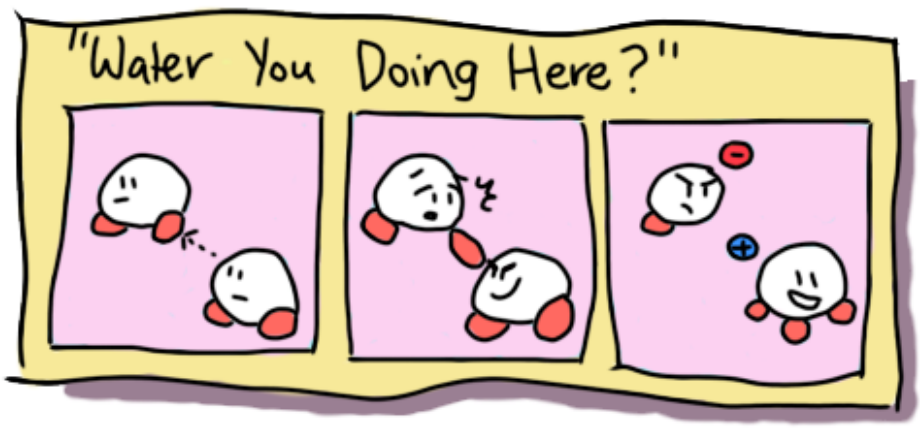
MWAHAHAHA!

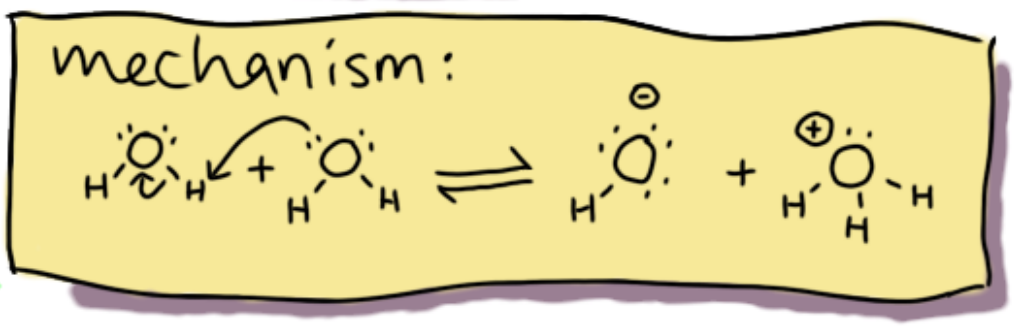
* this is a direct quote from my orgo prof last semester

...Anyway, my point is, you need to build a strong fondation to be able to get to the cool stuff later. So, for this assignment, I want you all to choose a reaction from this unit and illustrate one of the steps in a comic format.

Along with your comic, I would also like you to submit a detailed mechanism for the steps you have chosen and a brief essay describing why you made the choices you did and your thoughts on how helpful this assignment was in gaining further understanding of the material.

I've included a simple example below.





With that, class:

Take chances, make mistakes, get messy!