Background: This week, we are going to be working on alkenes and their reactions. As we already saw, we can use curved arrows to show the movement of electrons in chemical reactions as a part of a mechanism. This is what makes alkenes so interesting (to us, most of the world can't be bothered).

We are going to keep that up and add some very specific reactions to the mix. These will be presented with mechanisms that have been experimentally verified using thermodynamic and kinetic data. For the next few class periods we are going to go through a series of chemical reactions and their mechanisms. With any luck, we should be able to determine the exact stereochemistry of the product(s).

We will start with the addition of a hydrogen halide (HX) to an alkene. The halide will add to one carbon and the hydrogen will add to another. It turns out that there is a method to this and one type of product will be dominant. This is related to the overall stability of the carbocation that is formed in the process.

We will come to a tendency known as Markovnikov's Rule. This rule describes where a substituent will be added in an organic molecule, when more than one option is available. In short, we end up forming the most stable carbocation. Try to think of things in terms of stability and you will be OK.

We will progress to the addition of –OH groups to molecules to make alcohols. These are another class of compounds that we will be studying as we move forward. It is very similar to the hydrogen halide addition, except that the halide is a hydroxide anion. Since this involves carbocation intermediate (as opposed to a transition state) there is the opportunity for it to rearrange, and we will need to take that into consideration.

Part of organic chemistry is to *justify* the products as opposed to merely predicting them. We're not wizards.

Outcomes: Upon successful completion of the week, students should be able to:

1. Draw and name various alkenes and discern their relative stability.
2. Document the mechanism for the addition of hydrogen halide across a double bond.
3. Document the mechanism for the addition of water across a double bond.
4. Describe all the steps in a hydroboration reaction, and predict the products.

Recommended Problems:

6.55, 6.63, 6.68, 6.73, 6.76, 6.80