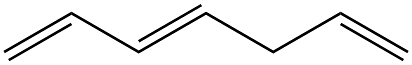
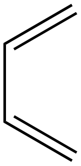
Conjugation #1: Intro to Conjugated Systems and Allylic Charges

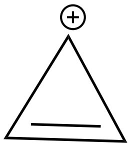
Hey, hey, hey ☺. Welcome to O Chem 2, guys and gals. So for those new to jOeCHEM, I'm Joe—nice to meet you. For my seasoned vets back for round 2, nice to see you again.

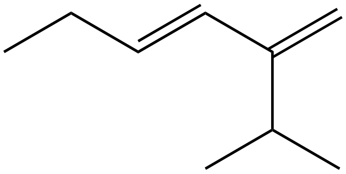
If you're new to the organic squad, here's the drill. There are videos on the site explaining organic topics, and these topics have corresponding worksheets to help you become a boss at **everything** we cover. Since you're all here right now, that means it's time for us to show Conjugation who's in charge. In my opinion, this is some of the simpler material in O Chem 2, so it's a good starting point. But enough chit chat—let's do some organic stuff ☺.

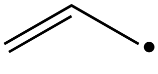
1.) Let's slide into this worksheet nice and easy: Given the molecules below, indicate whether or not each structure is conjugated or not conjugated. Remember, conjugation requires **AT LEAST** 3 consecutive atoms to have parallel p orbitals with one another, aka they need be sp^2 hybridized (or have an atom with a lone pair that can "act" like it's in a p orbital). You got this ☺.

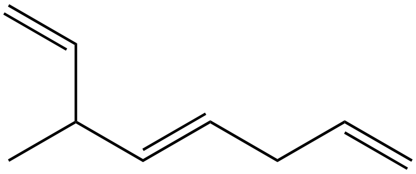


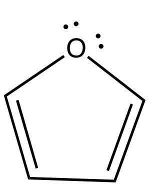


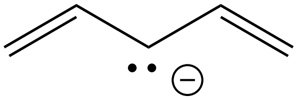


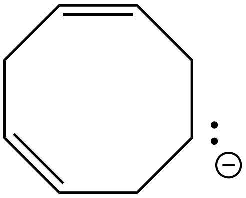






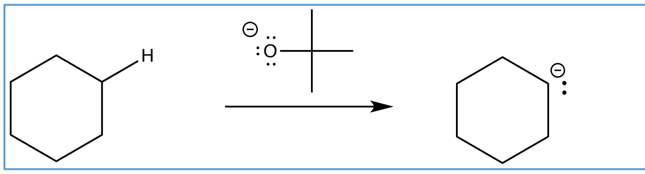




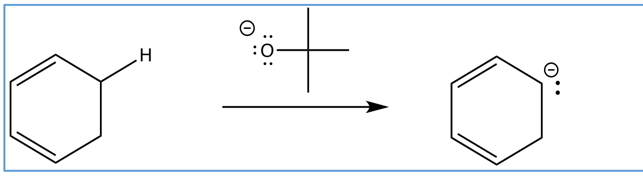


2.) Okay, not too bad right? You just have to make sure there are 3 or more carbons either part of a double or triple bond, a carbocation, a radical, or have a lone pair to align with the p orbitals. Alrighty, we'll keep it short on this first worksheet, so we just have a few more problems to do.

a.) Whether you followed along here on jOeCHEM for O Chem 1 or not, we all know ***<u>resonance</u>*** is always a good, stabilizing force for molecules. Keeping that in mind (hint, hint), if we performed the Acid-Base reactions show in Reactions 1 and 2 in real life, I'd bet you a nickel **Reaction 2** would be more favorable than 1 because, well, it would be. Illustrate with structures and a brief explanation why Reaction 2 is more favorable than Reaction 1 (and why I would be keeping my nickel).



Reaction 1



Reaction 2

b.) Awesome—good job. Okay, so let's play that game again. Given Reaction 1 and 2 below, this time I'm telling you the formation of a carbocation is more favorable in **Reaction 1** than Reaction 2. Just like in part a.) use structures and your flashy organic vocabulary (keep the words to a minimum though) as to why that is the case.

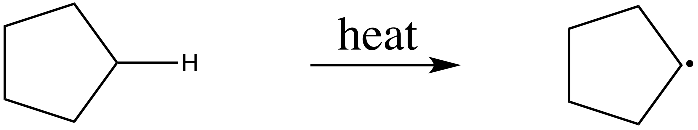
**Throwback to O Chem 1 (sorry if this is redundant), but remember alcohols are nucleophilic and easily protonated, which turns them in water, aka a good leaving group, which likes to leave during solvolysis when you have a polar-protic solvent. Just a little reminder for my organic homies ☺.

Reaction 1

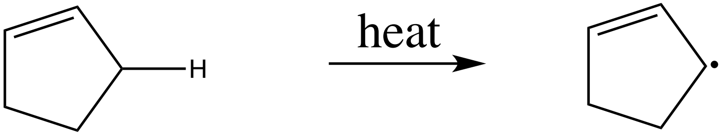
Reaction 2

c.) Okay, okay, I see you: Good job. Last problem, and then that wraps up your first worksheet in O Chem 2.

Same deal as the last two. During a process called Thermal Cracking (don't worry about what that is), molecules are heated to hella hot temperatures, and carbon-hydrogen bonds are broken, forming radicals. Below, the formation of the radical in **Reaction 2** is more favorable than the formation of the radical in Reaction 1. And I bet you can guess what your job is: Show me why that's the case.



Reaction 1



Reaction 2