

## RESONANCE STRUCTURES

“Resonance” involves lone pairs and pi bonds only.

If sigma bonds are involved, then you are dealing with a reaction, not with resonance.

### rules for drawing resonance structures

lone pair → pi bond pi bond → pi bond	<p><b>Forming a pi bond</b> is only legal when it is formed with:</p> <ol style="list-style-type: none"> <li>(1) a carbocation, or</li> <li>(2) an atom that’s simultaneously losing a pi bond.</li> </ol> <p>(It’s also legal to form a pi bond with an atom that can have an expanded octet, but this rarely comes up.)</p>
<del>lone pair → lone pair</del> pi bond → lone pair	<p><b>Forming a lone pair</b> is only significant when you’re:</p> <ol style="list-style-type: none"> <li>(1) moving electrons toward the more electronegative atom, or</li> <li>(2) making room for a pi bond .</li> </ol>

### electron-pushing arrows and the bonds

Every electron-pushing arrow tells you to:
<ol style="list-style-type: none"> <li>(1) break a bond, or</li> <li>(2) form a bond, or</li> <li>(3) break a bond and form a bond.</li> </ol>
You should break or form a bond only if there is specific electron-pushing arrow telling you to do so.

### electron-pushing arrows and the charges

For every new resonance structure, you should change two charges: the atom at the “initial tail” becomes one step more positive, and the atom at the “final head” becomes one step more negative.
Exception: If the electron-pushing arrows form a cycle, then there is no initial tail or final head, and hence no charges to change.
The net charge should be the same for all the resonance structures of a compound.