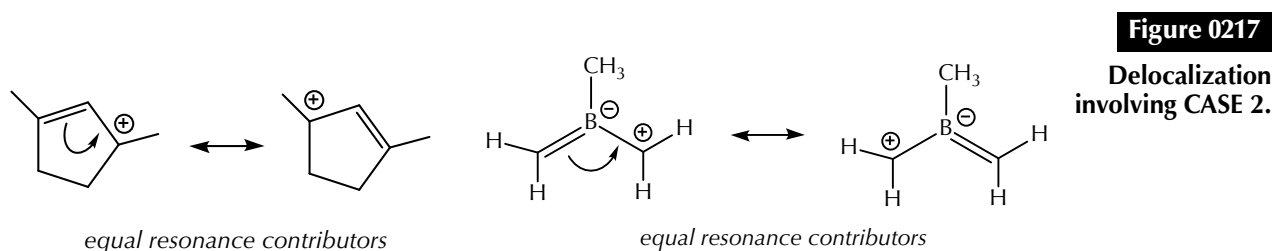


shell atoms is much more important to a structure than placing the positive charge on the less electronegative carbon atom, which requires the open shell contributor. Some representative examples of CASE 1 are shown in Figure 0216. Note that CASE 1 is actually the same as the “all multiple bonds are delocalizable” category, from earlier in this section: an open shell carbon attached to a carbon with a lone pair is the minor resonance contributor to the structure of a carbon-carbon double bond. In every example in Figure 0216, the all closed shell atom resonance contributor is by far the most significant.

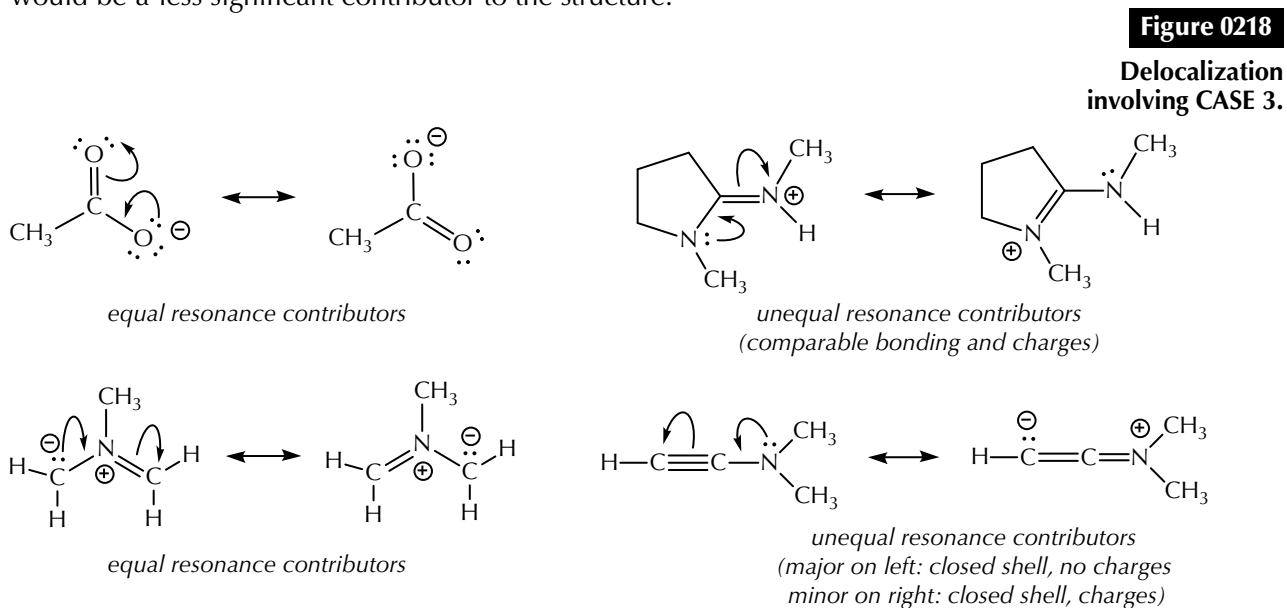
CASE 2: An open shell atom attached to an atom involved in a multiple bond (a 3-atom system). Another source of delocalizable electrons for an open shell atom is a multiple bond. When the open shell atom is part of a 3-atom system where it is attached to an atom that is involved in a multiple bond, a 2-electron bond can be delocalized over the atoms. Unlike the first case, however, completing the octet for the original open shell atom results in another open shell atom at the other end of the 3-atom chain. The question of which is the more significant contributor is a complex topic that will be taken up later, and so a couple of symmetrical examples are shown in Figure 0217, representing cases where the two contributors are equivalent.



Delocalization involving CASE 2, an open shell atom attached to an atom involved in a multiple bond (a 3-atom system).

CASE 3: An atom with a lone pair is attached to an atom involved in a multiple bond (a 3-atom system). This 3-atom system is by far the most common one that you will encounter, because both of the resonance contributors have all closed shell atoms, and this is the only case in which that is always true. This case includes the anion derived from acetic acid, which was used to introduce delocalization in the previous section.

Examples of CASE 3 are shown in the Figure 0218. **Two** of the four examples are symmetrical, and the two drawings are expected to equal contributors to the actual structure. In the **final** example, although the atoms in both resonance contributors are all closed shell atoms, the contributor drawn on the left comprises uncharged atoms, while the one on the right, with formally charged atoms, would be a less significant contributor to the structure.



Delocalization involving CASE 3, an atom with a lone pair attached to an atom involved in a multiple bond (a 3-atom system).