molecular-orbital molecules containing three or more atom selectrons delocalized the section on Resonance Lewis diagram

As an example of this we shall apply MO theory to the pi orbitals in ozone. The sigma bonds in this molecule may be attributed to overlap of $sp^2$ hybrid orbitals on each of the three oxygen atoms. You will recall that $sp^2$ hybrids are directed toward the corners of an equilateral triangle, in reasonable agreement with the 117° angle in ozone. For the sigma bonds and lone pairs, then, we have the Lewis diagram

![Lewis diagram of ozone](image)

**Figure \[\PageIndex{1}\]** The molecular orbitals of ozone

The MO treatment can also be used to interpret the spectrum of ozone. Ozone in the earth’s stratosphere absorbs much solar ultraviolet radiation which would otherwise cause damage to the biosphere. This absorption is due to a band centered around 255 nm which corresponds to excitation of an electron to the unfilled antibonding pi orbital shown in Figure \[\PageIndex{1}\] c.

Another important molecule to which MO theory can be applied usefully is benzene. As described in "Resonance," benzene can be represented by the resonance hybrid

![Resonance hybrid of benzene](image)
Figure \(\PageIndex{2}\) The pi molecular orbitals in benzene. When the six p orbitals shown in (a) are combined, they can form a total of six molecular orbitals. Only three of these are occupied, and they are shown in (b), (c), and (d). The net effect of the three filled orbitals (b), (c), and (d) is a double hexagonal ring similar to (b) but slightly larger. This contains six electrons, giving three bonds evenly distributed between all six carbon atoms.