



... we can determine which of these structures is more likely by calculating formal charges!

$$\text{H}: 1 - 1 - 0 = 0$$

$$\text{C}: 4 - 3 - 2 = -1$$

$$\text{N}: 5 - 4 - 0 = +1$$

$$\text{H}: 1 - 1 - 0 = 0$$

$$\text{C}: 4 - 4 - 0 = 0$$

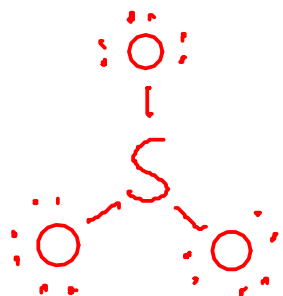
$$\text{N}: 5 - 3 - 2 = 0$$

Which structure is more likely?

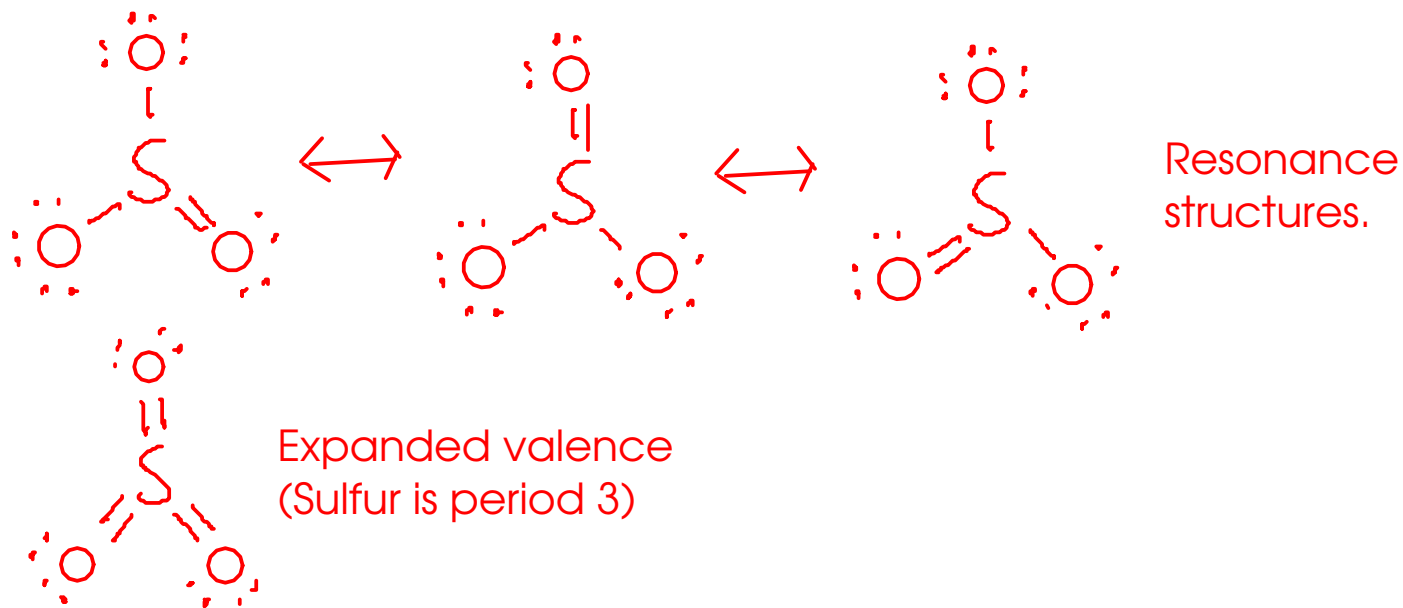
The HCN (structure on the right) is more likely than the HNC structure. The HCN structure has lower formal charges.

Let's look at sulfur trioxide. SO_3

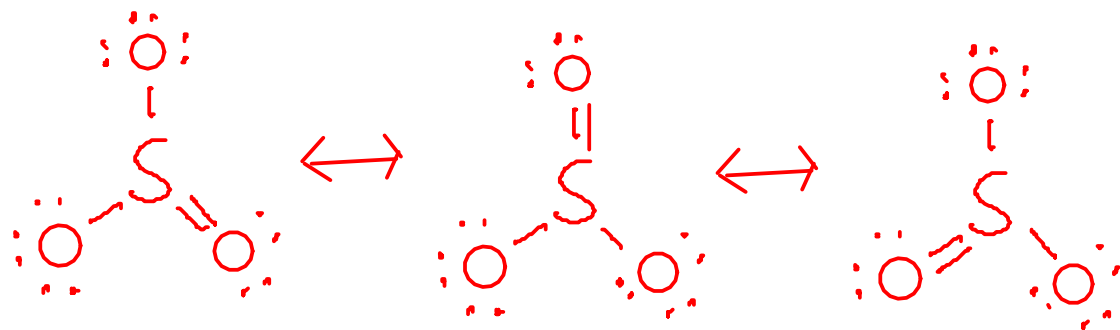
Skeletal structure:



$$\begin{array}{r} \text{S: } 6 \\ \text{O: } 6 \times 3 = 18 \\ \hline 24 e^- \end{array}$$



To decide which structure is preferred, let's look at formal charges.



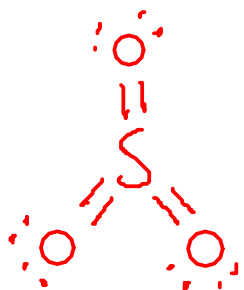
Resonance structures.

$$\text{S: } 6 - 4 - 0 = +2$$

$$\text{O-: } 6 - 1 - 6 = -1$$

$$\text{O-: } 6 - 1 - 6 = -1$$

$$\text{O=: } 6 - 2 - 4 = 0$$



Expanded valence
(Sulfur is period 3)

$$\text{S: } 6 - 6 - 0 = 0$$

$$\text{O=: } 6 - 2 - 4 = 0$$

$$\text{O=: } 6 - 2 - 4 = 0$$

$$\text{O=: } 6 - 2 - 4 = 0$$

The preferred structure of sulfur trioxide is the expanded valence version! (It has lower formal charges than the resonance version which obeys the octet rule.)