ChemQuest 25

Formal Charge

Name: _____

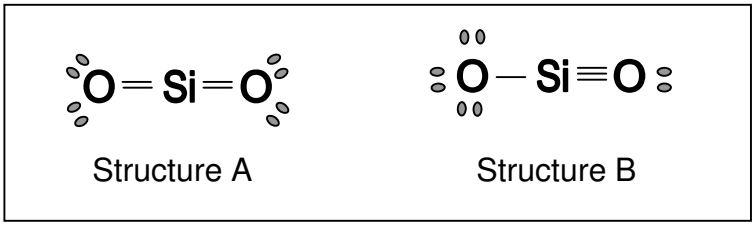
Date: _____

Hour: _____

Information: More than one possible Lewis Structure.

Sometimes when you draw a Lewis structure you discover that there is more than one possible way to draw it. For example, consider the following Lewis Structures for sand, which is silicon dioxide:

Diagram #1:



Critical Thinking Questions

1. What is the total number of electrons allowed in the Lewis structure for SiO_2? Do both of the above Lewis structures have the correct number of electrons pictured?
   16; you find this by adding up the total valence electrons of each atom involved. Oxygen has 6 valence electrons since it is in column 16. Each silicon has 4 valence electrons. Adding it all up looks like this: 6(2) + 4 = 16.

2. Is each of the proposed structures above a legitimate Lewis structure for SiO_2? (In other words, in each of the proposed structures are all of the "rules" that you know followed?) Explain.
   Both Lewis Structures look good according to the rules we know of so far. There are the correct number of electrons in the picture (16) and every atom is sharing enough electrons so that each has 8.

3. According to a large number of experiments, both of the silicon-oxygen bonds in SiO_2 are identical. Given this information, which Lewis structure, A or B, is a better description of the bonding in SiO_2. Explain.
   Given this experimental evidence, Structure A is better because both of the bonds in Structure A are identical.