Chemistry I Name _____

Date _____ Per ____

3D Molecular VSEPR Computer Lab

First: What does VSEPR stand for?

_____ _____ _____ _____ _____

In this lab we'll be looking at the characteristics and structures of a variety of molecules. You'll want to keep two windows open: wikipedia and 3dchem.com.

1) CCl_4 Go to wikipedia and search for carbon tetrachloride.

Look under the "uses" category. What did stamp collectors use this for? _____

_____

Carbon tetrachloride can harm your central nervous system and two of your major organs. What are those two organs?

_____ and _____

Open a new window (save wikipedia) and go to http://www.3dchem.com. Click on the blue link titled "Library of Inorganic Structures (over 1600 structures)" to find CCl_4,. To find it, click on the C or Cl box on the periodic table and look around for CCl_4. Click on the images that show up until you get the one that rotates (it may take a while to load).
Play around with the controls a bit. Then sketch the molecule.

From your old notes: What is the name of this shape? _____

2) H_2S Go back to the wikipedia window and search for h2s.

Does this compound smell good? _____ Look under "toxicity". What body

system is most affected by it? _____

What does "ppm" stand for? _____

How many ppm tends to be fatal? _____

How many ppm can be smelled by half the people who try? _____

Back to http://www.3dchem.com. Click on the blue link titled “Library of Inorganic Structures (over 1600 structures)” Click on the S box to look for H_2S
Play around with the controls a bit. Then sketch the molecule.

Would you guess there were lone pairs on the central atom of H_2S? _____

Why or why not? _____

What is the name of this shape? _____

3) CO_2 Go back to the wikipedia window and search for Lake Nyos. Read the introductory text.

Where is this lake? _____What lies beneath the lake?_____

_____ What does it leak into the water? _____

What came out of this lake on August 21, 1986? _____

What did it do? _____

Is it now safe to live downhill from this lake? _____

Back to http://www.3dchem.com. Click on the blue link titled “Library of Inorganic Structures (over 1600 structures)” Click on the C or O box to look for CO_2 (Hint: it’s black and red.)

Play around with the controls a bit. Then sketch the molecule.

Would you guess there were lone pairs on the central atom of CO_2? _____

Why or why not? _____

What is the name of this shape? _____

4) HCN Go back to the wikipedia window and search for hcn.

What is its historical common name? _____ Hydrogen cyanide is a _____,

extremely _____ liquid that boils at _____ºF.

Back to http://www.3dchem.com. Click on the blue link titled “Library of Inorganic Structures (over 1600 structures)” Click on the C or N box to look for HCN.

Play around with the controls a bit. Then sketch the molecule.

Would you guess there were lone pairs on the central atom of HCN? _____

Why or why not? _____

What is the name of this shape? _____

5) NF_3 Go back to http://www.3dchem.com. Click on the blue link titled “Library of Inorganic Structures (over 1600 structures)” Click on the N or F box to look for NF_3

Play around with the controls a bit. Then sketch the molecule.

Would you guess there were lone pairs on the central atom of NF_3? _____

Why or why not? _____

What is the name of this shape? _____

6) BF_3 Go to http://www.3dchem.com. Click on the blue link titled “Library of Inorganic Structures (over 1600 structures)” Click on the B box to look for BF_3 .

Play around with the controls a bit. Then sketch the molecule.

Would you guess there were lone pairs on the central atom of BF_3? _____

Why or why not? _____

What is the name of this shape? _____

Finally, the two weird shapes:

7) SF_6 Go to http://www.3dchem.com. Click on the blue link titled "Library of Inorganic Structures (over 1600 structures)" Click on the S or F box to look for SF_6 .

Play around with the controls a bit. Then sketch the molecule.

Go back to wikipedia and search for sf6 to find the name of this shape.

_____

Scroll down to "Physiological effects and precautions". What does it do to the voice of someone who inhales a small amount of this gas? _____

_____

What precautions does this section include? _____

_____

8) PCl_5 Go to http://www.3dchem.com. Click on the blue link titled "Library of Inorganic Structures (over 1600 structures)" Click on the P or Cl box to look for PCl_5 .

Play around with the controls a bit. Then sketch the molecule.

Go back to wikipedia and search for phosphorus pentachloride to find the name of this shape.

It's in the following sentence: "Gaseous and molten PCl_5 is a neutral molecule with _____

_____ symmetry."

That's it! If you have any extra time, try looking at the gazillion other molecules on the 3d chem site. They're pretty amazing. My current favorite is $[Mo(CN)_8]^{3-}$. Can you find a better one?

_____