Molecular Shapes WebLab

Name and date submitted (3 pts):

1. Go to the PhET “Molecule Shapes” simulation. At the time of writing, it was located here <https://phet.colorado.edu/en/simulation/molecule-shapes> . Select the “Real Molecules” option. Also select “Molecule Geometry” and “Show Bond Angles”.

1. Complete the following table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Molecule | Lewis drawing | Bond angles | Shape name | 3-D Sketch |
| H2 |  |  |  |  |
| CH4 |  |  |  |  |
| NH3 |  |  |  |  |
| H2O |  |  |  |  |
| CO2 |  |  |  |  |
| HCN |  |  |  |  |
| CH2O |  |  |  |  |

1. Next, open the PhET “Molecule Polarity” simulation located here <https://phet.colorado.edu/en/simulation/molecule-polarity> . Select the “Real Molecules” option. Also select “Bond Dipoles”, “Partial Charges”, and “Molecular Dipole” as needed to complete the table below.

1. Complete the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Molecule | “Bond Dipoles” box:Describe any bond polarity, and state the partial charges on the atoms if they exist. | “Molecular Dipole” box: Is the molecule itself “polar”? Describe the molecular dipole, if there is one. | Check “Electrostatic Potential” box:Describe the red (negative) and blue (positive) regions of the molecule, if they exist. |
| H2 |  |  |  |
| CH4 |  |  |  |
| NH3 |  |  |  |
| H2O |  |  |  |
| CO2 |  |  |  |
| HCN |  |  |  |
| CH2O |  |  |  |

1. Predict the following shapes and angles (surrounding the central atoms) for the following. Determine what type of polarity also

H2Si2 (Disilyne is an interesting one: sketch it on Avagadro to see shape, bond length, and angles)

N2O4 (Dinitrogen Tetroxide: sketch it on Avagadro to see shape, bond length, and angles)

CH3F (you can research Fluoromethane online)