**TITLE**

Molecule Polarity

**AUTHORS**

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**COURSE**

General Chemistry I

**TYPE**

In-Class Guided-Inquiry Activity

**TEACHING MODE**

Facilitated Group Inquiry

**LEARNING GOALS**

Students will be able to:

* Explain the relationship between bond dipoles and molecule dipole.
* Accurately predict and explain the bond dipoles and molecule dipoles of simple, real molecules.

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MOLECULE POLARITY

**PART I: TWO ATOMS SCREEN**

1. Explain **all the ways** you can change the polarity of the two-atom molecule.
2. **Record your ideas** in the table below.

|  |  |  |
| --- | --- | --- |
| Representation | **How does each change as electronegativity changes?** | **How does each help you understand the polarity of molecules?** |
| Bond Dipole |  |  |
| Partial Charges |  |  |
| Electrostatic Potential |  |  |

**PART II: THREE ATOMS SCREEN**

1. Explain any **new** ways to change the molecule polarity of the three-atom molecule.
2. How does the **ABC-bond angle** effect molecule polarity? Tip: Try changing the bond angle in the simulation.
3. Explain the relationship between the **bond dipoles** and the **molecule dipole**.
4. Can a non-polar molecule contain polar bonds? Use an **example** to explain your answer.

PART III: REAL MOLECULES SCREEN

1. **Predict** the polarity of four real molecules in the simulation. Explain your reasoning before you check your predictions with the simulation.

|  |  |  |
| --- | --- | --- |
| YOUR PREDICTION | | CHECK  Your Prediction |
| Draw Molecule -  Include Bond Dipoles & Molecule Dipole | Explain Your Reasoning: | Correct? Explain any differences. |
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1. Discuss with your group the method(s) that you used to determine the bond dipoles and the molecule dipole. Write your method(s) in complete sentences below.

EXERCISES

|  |  |  |
| --- | --- | --- |
| Molecule | Molecule Geometry | Is the Molecule Polar? Explain Why or Why Not. |
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Determine the Molecule Geometry and Polarity of the following molecules.

CHALLENGE PROBLEMS:

For each molecule below: Determine the Lewis structure and molecule geometry. Draw the molecule using wedges to show three-dimensionality. Finally, determine if the molecule is polar. If so, draw an arrow to show the molecule dipole.

1. CHO2-1
2. PF3
3. AlCl3
4. CHBr3
5. H2S
6. SiCl4
7. HCCBr
8. CH2CHCHCH2
9. BrF4+(Br is central atom and has 10e- in its valance shell)