

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

### In-Class Activity: Structures and Properties of Isomers

Please hand in this assignment by the end of the class period.

#### Essential Learning:

1. Determine the molecular geometry and names for isomers of saturated and unsaturated hydrocarbons.
2. Analyze isomers of hydrocarbons to compare physical properties.

#### Background Information:

**Saturated hydrocarbons**, also called alkanes, have single carbon-carbon bonds. **Unsaturated hydrocarbons**, or alkenes and alkynes, have at least one double or triple bond in their structure. Straight-chain hydrocarbons are the most basic structure for these molecules, but each has **isomers** that contain the same number of carbon and hydrogen atoms, but in a different formation.

#### Instructions:

1. Fill in the charts for each of the eight isomers.
2. Give a GENERAL rule for how the following affects the strength of the intermolecular forces. You may not use all of the information for each rule!
  - a. Size of molecule (molar mass)
  - b. Shape (straight chain vs branched chain)
  - c. Types of bonds (single, double triple)

<b>C<sub>4</sub>H<sub>10</sub></b>	<b>Isomer 1</b>	<b>Isomer 2</b>
Name	butane	2-methylpropane (isobutane)
Molar Mass (g/mol)		
Line Diagram		
Boiling Point (°C)	-1°C	-11.7°C

<b>C<sub>4</sub>H<sub>8</sub></b>	<b>Isomer 1</b>	<b>Isomer 2</b>	<b>Isomer 3</b>
Name	1-butene	2-butene	2-methylprop-1-ene (isobutylene)
Molar Mass (g/mol)			
Line Diagram			
Boiling Point (°C)	-6.5°C	3.7°C/0.9°C	-6.9°C

<b>C<sub>4</sub>H<sub>6</sub></b>	<b>Isomer 1</b>	<b>Isomer 2</b>	<b>Isomer 3</b>
Name	1-butyne (dimethylacetylene)	2-butyne (ethylacetylene)	buta-1,3-diene
Molar Mass (g/mol)			
Line Diagram			\
Boiling Point (°C)	8.08°C	27°C	-4.4°C