

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

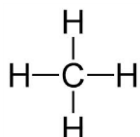
Ms. Randall (compliments of Mr. Palermo)

### Organic Chemistry Inquiry: Structural Formulas

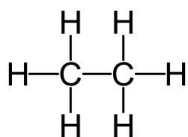
**Background:** Structural formulas show the arrangement of the atoms within the molecules as far as which atoms are bonded to which and whether single, double or triple bonds are used.

#### MODEL 1:

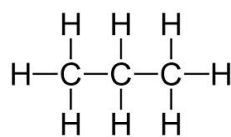
#### Structural formulas for alkanes



*methane*

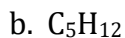
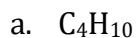


*ethane*



*propane*

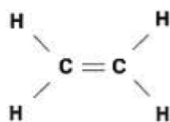
1. Using model 1 above, draw the structural formula for the following alkanes. (Refer to table P and Q in your reference table)



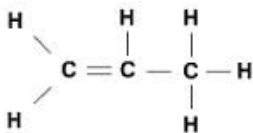
2. Name the compounds in question 1.

**MODEL 2:**

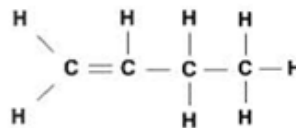
**Structural Formulas for Alkenes**



*ethene*



*propene*



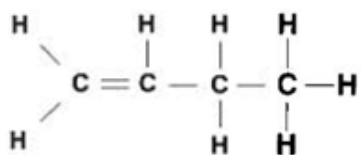
*butene*

1. Based upon model 2 and your knowledge of alkenes, why does the compound methene not exist?
2. Why do the carbons with the double bond contain 1 less Hydrogen than carbon that contains a single bond?
3. Using model 2 above, draw the structural formula for the following alkenes. (Refer to table P and Q in your reference table)

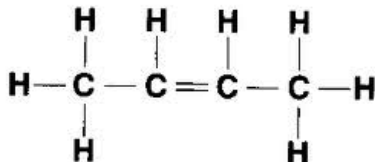


**READ THIS!!!!** When naming alkenes you must give the location of the double bond in the name when there are more than 3 carbons in the compound. You do this by numbering the carbon atoms and stating which number carbon the double bond is on. You can number the carbon atoms from left to right or right to left which ever gives the double bond the lowest possible numbered location. This is because compounds are not stationary in the “real world” and are therefore constantly moving See Model 3 below.

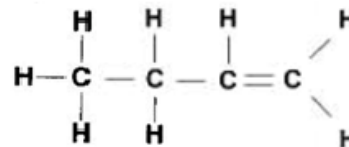
**MODEL 3:**



*1-butene*



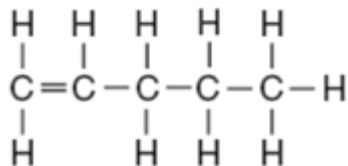
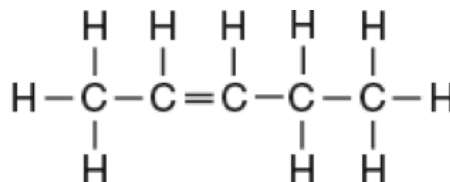
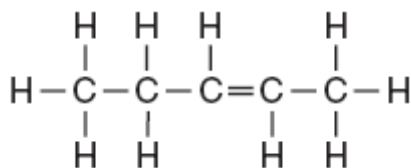
*2-butene*



*1-butene*

1. Why is the third compound in model 3 not called 3-butene?

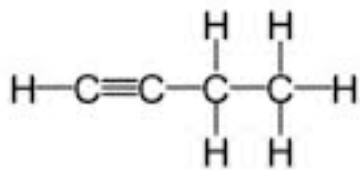
2. Using model 3 and reference tables P & Q name the following compounds:



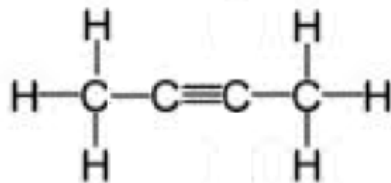
**READ THIS!!!** Drawing structural formulas for alkynes is exactly the same as alkenes except they contain a triple bond instead of a double bond.

**MODEL 4:**

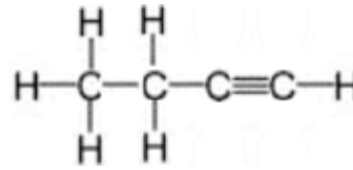
**Structural Formulas for alkynes**



*1-butyne*



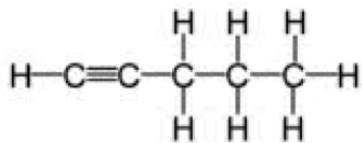
*2-butyne*



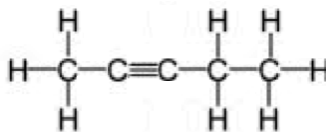
*1-butyne*

1. Why do the carbons with the triple bond contain no bonded hydrogen's?
2. Using model 2 above, draw the structural formula for the following alkynes. (Refer to table P and Q in your reference table)
  - a.  $C_5H_8$
  - b.  $C_6H_{10}$
  - c.  $C_7H_{12}$

3. Name the following compounds:



\_\_\_\_\_



\_\_\_\_\_

**EXTENSION:**

*Draw the structural formula for the following compounds:*

a.  $C_8H_{16}$

b.  $C_4H_6$

c. 2-hexene

d. 2-heptyne

e. 3-hexene

f. 1-heptyne