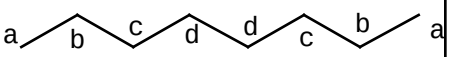
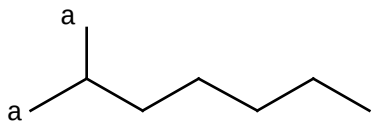
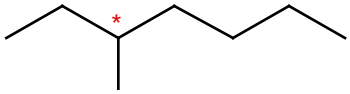
Isomers of Octane Experiment
Chemistry 231L
Dr. Gergens - SD Mesa College

Name:_____

Section:_____ Date:_____

Write out the line-angle formula for all 18 isomers with the formula C_8H_{18}. **Organize the isomers from decreasing parent chain length starting with octane**. The first three are done for you. Give all isomers an I.U.P.A.C. name. Identify by letter, all equivalent carbon atoms. Use the first three examples as a guideline. Note, 3-methylheptane has no equivalent carbon atoms because it is asymmetric due to its chiral center marked '* '. Mark all asymmetric centers with a '* '. Finally, answer the questions on the next page.

(click here for more information) 		
Name: octane	Name: 2-methylheptane	Name: 3-methylheptane
Name:	Name:	Name:
Name:	Name:	Name:
Name:	Name:	Name:
Name:	Name:	Name:
Name:	Name:	Name:

Isomers of Octane - Additional Questions
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Answer the following questions. Use a molecular model kit to assist you.

1. Give the total number of each isomer having the following parent chain name. octane ____, heptane ____, hexane ____, pentane ____, butane ____, propane ____?

2. How many alkanes have the ethyl— branch in its name ____. Give their IUPAC name:

3. How many alkanes have the propyl— branch in its name ____. Give their IUPAC name:

4. How many alkanes have the isopropyl— branch in its name ____. Give their IUPAC name:

5. How many alkanes have the prefix **di** in their IUPAC name ____.

6. How many alkanes have the prefix **tri** in their IUPAC name ____.

7. How many alkanes have the prefix **tetra** in their IUPAC name ____.

8. How many alkanes have <u>only</u> one chiral carbon center ____ . A tetrahedral carbon atom that bears four different substituents is called a chiral center. Give their IUPAC name:

9. How many alkanes have two chiral centers ____. Give their IUPAC name:

10. Which alkane appears to have six equivalent methyl branches its structure? Give its IUPAC name:

11. Which alkane appears to have three equivalent ethyl branches in its structure. Give its IUPAC name:

12. How many alkanes contain both two equivalent methyl and two equivalent ethyl branches in its structure? Give their IUPAC name:

13. Which alkane appears to have two equivalent sec-butyl branches? (Hint: It is the one with two chiral centers as well). Give its IUPAC name:

14. Which alkane appears to have two equivalent n-butyl branches in its structure? Give its IUPAC name:

15. Which alkane appears to have two equivalent isobutyl branches in its structure? Give its IUPAC name:

16. Which alkane appears to have two equivalent t-butyl branches in its structure? Give its IUPAC name:

17. Which alkane appears to have two equivalent n-propyl branches in its structure? Give its IUPAC name:

18. Which alkane appears to have two equivalent isopropyl branches in its structure? Give its IUPAC name:

19. Which chiral molecule appears to have a methyl, ethyl, n-butyl branch about its chiral center? Give its IUPAC name:

20. Which chiral molecule appears to have a methyl, ethyl, t-butyl branch about its chiral center? Give its IUPAC name:

21. Which chiral molecule appears to have a methyl, propyl, isopropyl branch about its chiral center? Give its IUPAC name:

22. IUPAC stands for_____