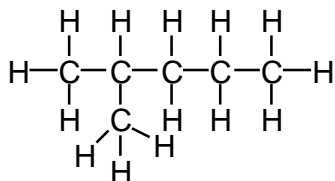


eChem - PART II NAMES OF ALKANES

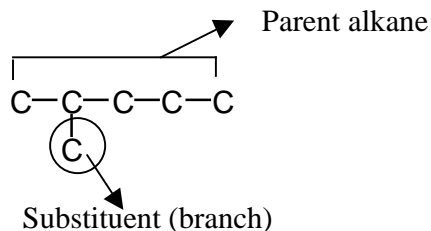
In "Hydrocarbons and Alkanes", you learned that the rule for naming unbranched alkanes is to put the name of number first (one=meth, two=eth, prop=three, but=four, pent=five, hex=six, hept=seven, oct=eight, non=nine and dec=ten) and then add "ane" on it. But not all alkanes have only a linear carbon chain. In this activity, you'll learn how to name an alkane with substituent groups, which are branches of molecules. These naming rules are based on the IUPAC (International Union of Pure and Applied Chemistry) system.

For example, consider the molecule represented by the structure:



It looks like pentane (C_5H_{12}), but has one more carbon with three hydrogens. It has six carbon atoms as hexane does (C_6H_{14}), but these six atoms do not attach as a linear chain. So how can we name it?

Step 1: Identify the longest continuous carbon chain, which is the parent alkane.



Name(s) _____

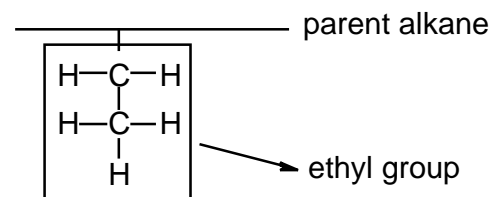
In this case, how many carbon atoms does the longest continuous chain have? _____

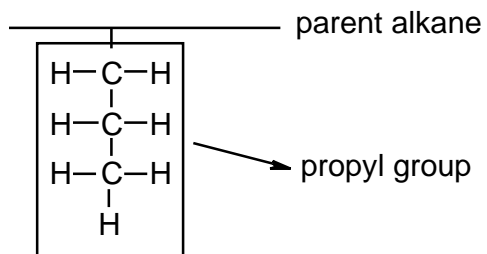
Based on the naming rule with no branch, the parent alkane with this number of carbons is called:

Step 2: Identify the substituent groups attached to the parent chain.

In this case, the parent chain bears a group with one carbon and three hydrogens, which is called "*methyl*." The groups with only single bonds, carbons and hydrogens are "alkyl" groups. Alkyl groups are named by dropping the *-ane* ending of the corresponding alkane and replacing it with "*yl*."

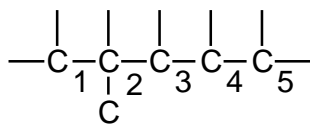
For example,



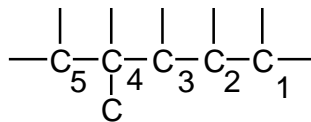


Step 3: Number the parent alkane in the direction that gives the lowest number to the substituent groups at the first point of branching.

In this case, we have two choices to give numbers.



(a)

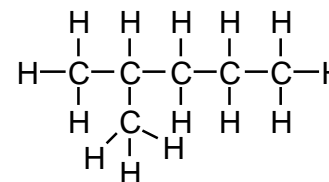


(b)

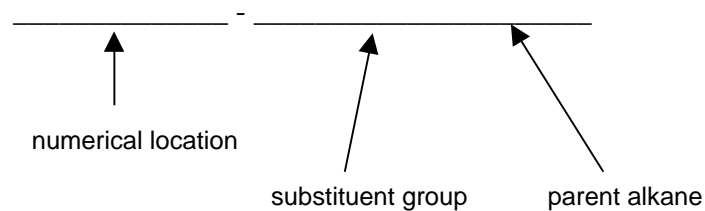
Following the rule, you should choose _____, because the methyl group attaches to the carbon of the lower number.

Name(s) _____

Step 4: Write the name of the compound. The parent alkane is the last part of the name and is preceded by the names of the substituent groups and their numerical locations.



Three parts of the name:

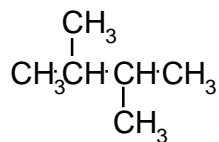


Got it? Let's practice by naming another molecule.

Name(s) _____

Step 1: Identify the longest continuous carbon chain.

In this case, the parent alkane is _____

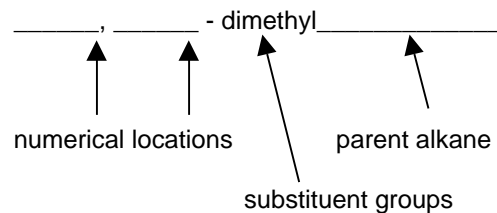
**Step 2:** Identify the substituent groups.

When the same substituent appears more than once, use the multiplying prefixes *di-*, *tri-*, *tetra-*, etc. In this case, there are two methyl groups as substituents on parent chain, so they are *dimethyl*.

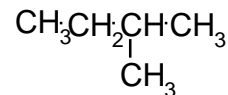
Step 3: Number the substituent groups. Remember the lower number is better.

One group attaches to carbon number _____.

The other attaches to carbon number _____.

Step 4: Write down the three parts of name.

1. Name the molecules below and draw them on eChem.



Step 1: The parent alkane is _____.

Step 2: The substituent group is _____.

Step 3: This substituent group attach carbon number _____.

Step 4: Its IUPAC name is _____.

2-Names of alkanes

Name(s) _____

2. Draw 2, 2-dimethylpentane in eChem and on paper.

4.

(a) Draw your own molecule with a total of 5 carbon atoms and 2 substituent groups on paper.

3. Make you own molecule with a total of six carbon atoms and one substituent group in eChem. Name it and also draw it on paper.

(b) Create your model in eChem.