Naming hydrocarbons

- Hydrocarbons are made up of Carbon and hydrogen.

- There are many ways to draw them, the thing to remember always is that each Carbon MUST be “holding” onto 4 things (until university, and even only then sometimes, and not for very long.)

Ways to draw things…

In order to name any organic compound, you must remember the prefixes…

- 1- meth
- 2-eth
- 3-prop
- 4-but
- 5-pent
- 6- hex
- 7- hept
- 8-oct
- 9- non
- 10- dec

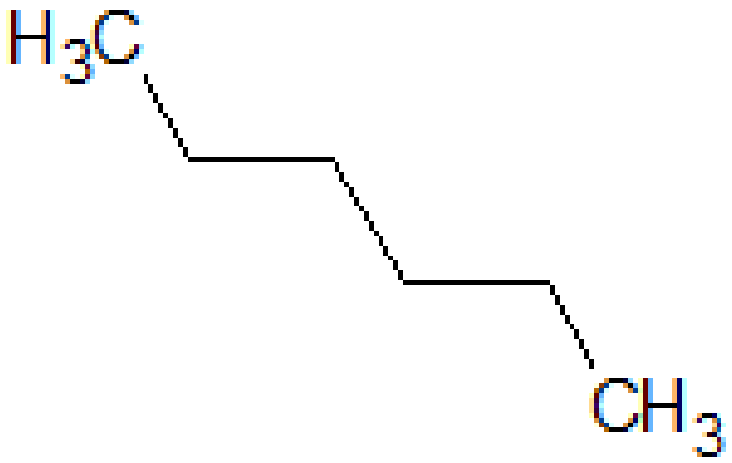
The name has 3 parts

- The ROOT. Consists of the longest CONTIUOUS carbon chain.
- The PREFIX. Tells you about the groups that are attached to the chain, and where they are.
- The SUFFIX. Tells the class of the compound

Naming Alkanes

- An alkane is any carbon containing compound that only has single bonds.
- They are called “saturated” as the carbons are bonded to the maximum number of other atoms.
- General formula C_nH_{2n+2}, and the suffix is “ane”

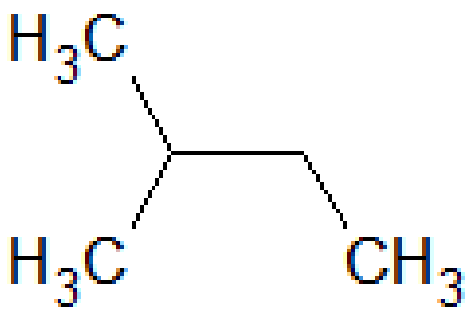
Straight chain alkanes



Branched chain alkanes

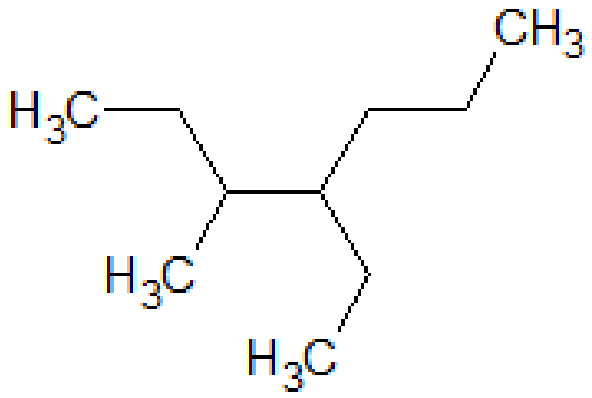
- Remember, you must choose the longest continuous carbon chain as the root.

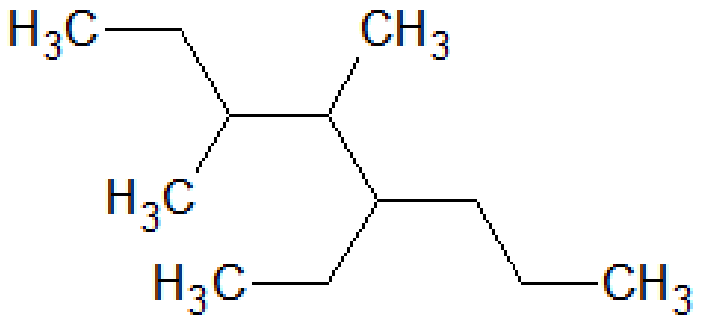
- You must then number the carbons, and include the side chains… though the side chain ending is changed to “yl”



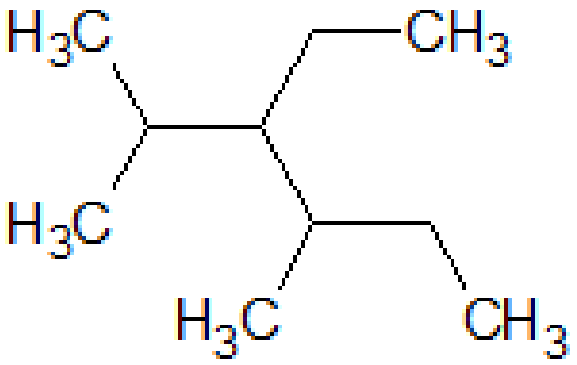
First point of difference

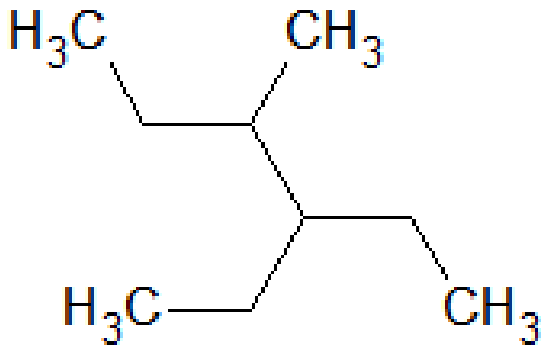
- The side chains are listed in alphabetical order. If there are two possible sets of numbers, you must use the set that stars with the with the lowest possible number assigned to the “most important” group





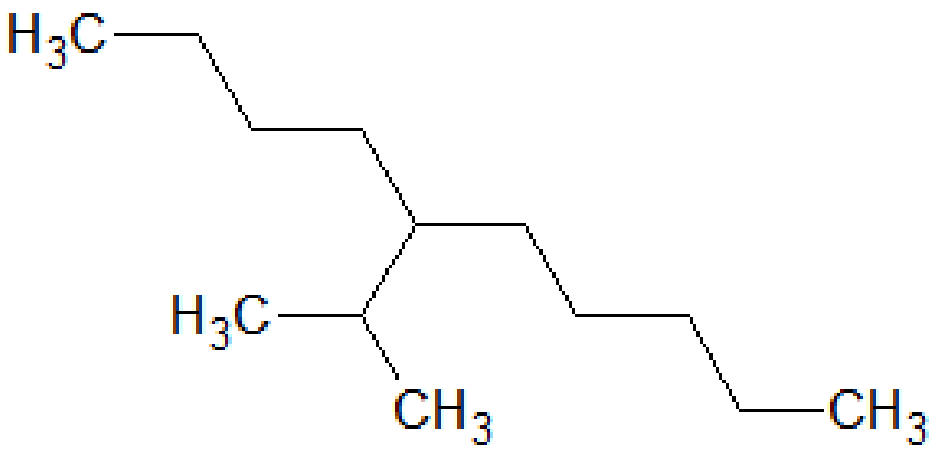
What if there are 2 equal chains?





Oh noes! Complex branched chains

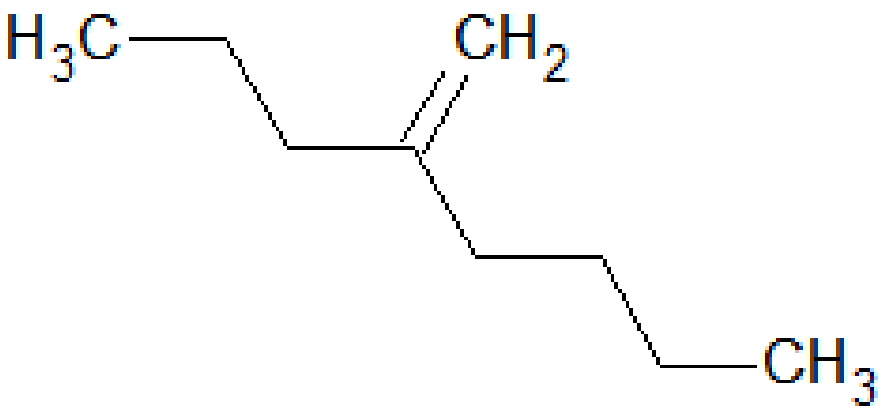
- Just treat the branched chain as a separate entity… all endings are “yl”



Alkenes

- An alkene is a carbon containing compound that has at least one double bond in it.
- The parent chain should have the double bond in it unless there is a longer chain available.
- A double bond is more important than a side chain, so numbering is done to keep its numbers lowest.

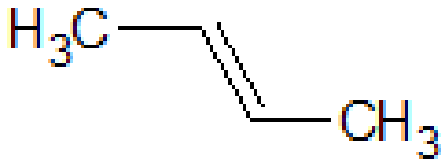
Like this one for instance…



4-methylideneoctane

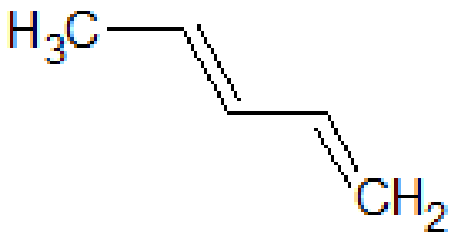
Goofy things that turn out to be useful.

- Numbering your double bond “inside” the name is totally legit, (actually more legit.) It looks funny, but it makes complex naming easier



- Can be either 2-butene or but-2-ene

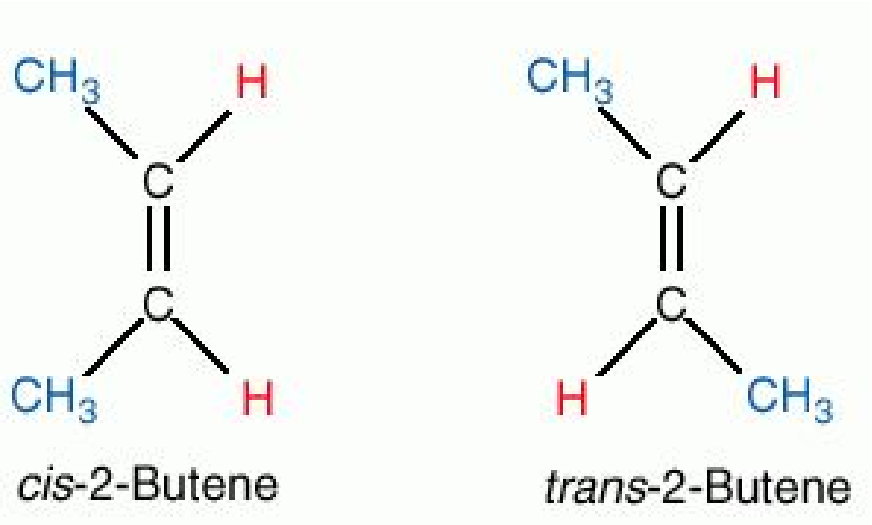
Multiple double bonds require prefixes!



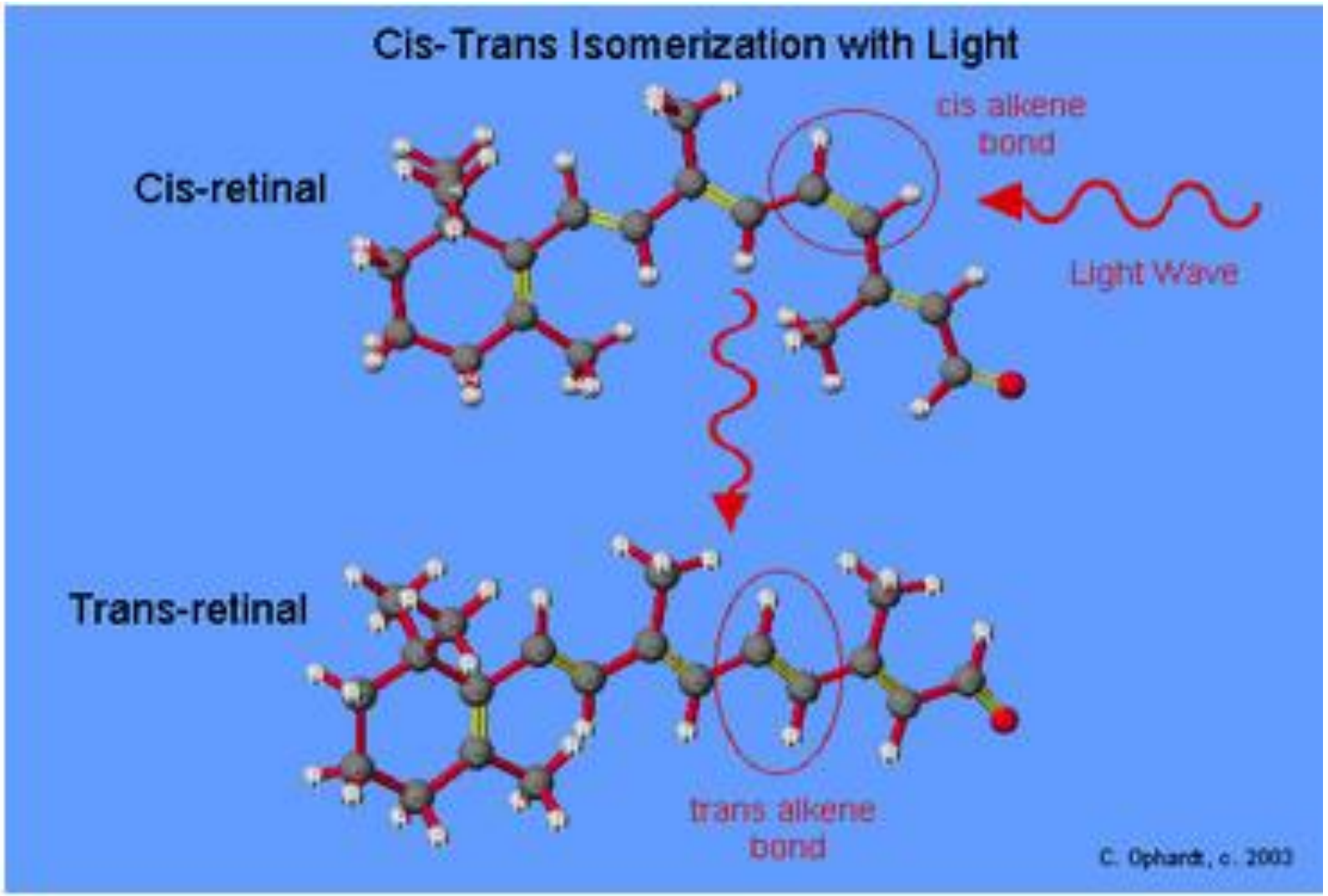
- The actual naming of this guy is a little more terrifying… but I will leave that to your 2nd year prof.

Things can be positioned differently about the double bond

- We call this geometric isomerism… or cis-trans isomerism (more advanced chemistry uses E / Z notation.)
- This happens because there is no free rotation about the double bond.

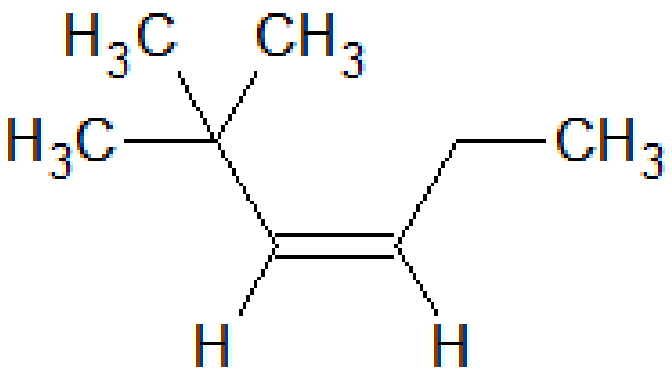


Way cool things…



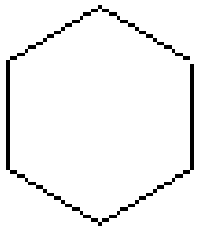
Try drawing this one

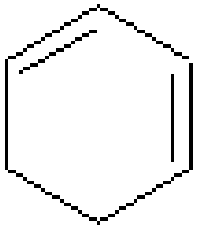
- Cis-2,2-dimethyl-3-hexene

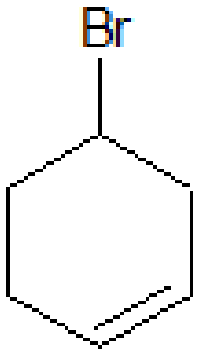

H3C
CH3
H3C
CH3
H
H

Rings!

- You can easily name a basic ring structure by adding the prefix “cyclo” to the name.
- Multiple bonds take priority on the numbering if they are there. There are specific rankings for substituents and multiple bonds that we wont get into…

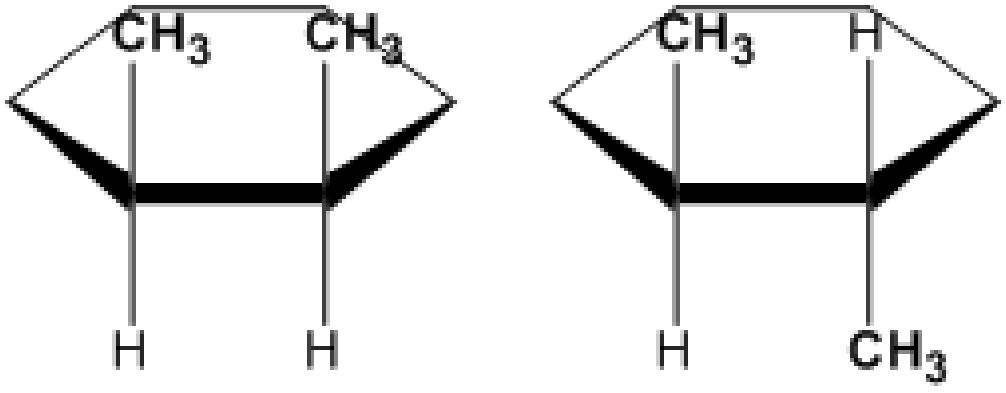






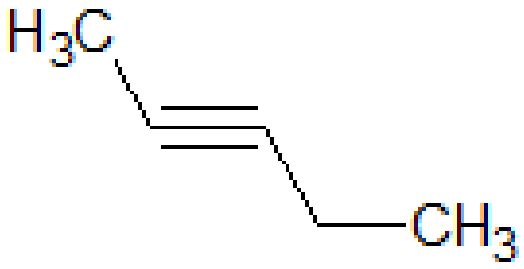
Rings can have cis-trans isomers too.

- Remember, if there is no free rotation about the bond, then the substituents are stuck there… and thus there are two possibilities.



Alkynes

- Alkynes are carbon chains that have at least one triple bond in it.
- The parent chain should have the multiple bond in it unless there is a longer chain available.
- The suffix is –yne, and yes… they must be numbered unless unambiguous


H3C
CH3