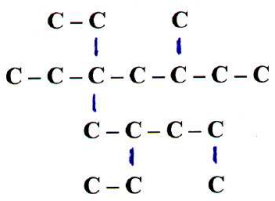
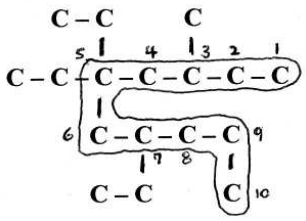
Tutorial – Organic Chem – Ch 22 Std 10

1. Always know how to find carbon # 1. For an organic molecule, this number is like the street address for your home. It lets you know where each substituent is located. # 1 is determined as follows:
   - **Alkanes –** the end of the longest chain, that has a substituent the closest to it
   - **Alcohols –** the end that the –OH group is closest to
   - **Aldehydes –** the end with the carbonyl group (double-bonded O and the carbon it is attached to)
   - **Ketones –** we don't number anything!
2. Number the longest chain to get the correct addresses of all substituents. This is critical for alkanes & alcohols.
3. If the chain weaves around or is complicated at all complicated, draw a circle around the carbons of the longest chain and then number the carbons. We always identify carbon #1 at the end that has substituents closest to that end. Drawing the circle (it is kind of like a maze where you can only go one way) makes the substituents stick out. Here is an example:





Notice how substituents stand out? Also, it is very easy to tell which number carbon they are attached to.

Now for the name: 3-methyl, 5, 5, 7-triethyldecane

1. **Alkanes (Chapter 22.1) THE SATURATED GANG (no double bonds)**

These tables should be on your help sheet and/or memorized:
Table 22.1 (page 700) - names of alkanes by length of their chains
Table 22.1 (page 702) - names all of the substituents you will be responsible for.

IUPAC Rules for Naming Alkanes - (page 702-703) **Remember that alkanes are saturated (no double bonds)**

Also try any of the homework problems for this section that you have answers for so you can see if you really understand what you have done. Do the ones that either ask you to name a compound from its formula, or draw a formula give the name of the compound.

2. **Alcohols (Chapter 23.2, p. 743-744) THESE ARE THE –OH CROWD**

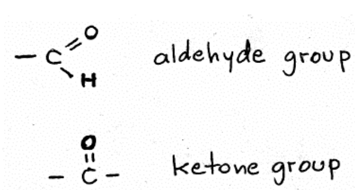
All alcohols have the following characteristics:

-OH (hydroxyl group)

Numbering always starts at the end the – OH group is closest to. The –OH group rules as to which end of the molecule is carbon #1. Any other substituents are named as usual.

3. **Aldehydes & Ketones (Chapter 23.3 p. 747-748) THESE ARE THE – C = O CROWD**

– C = O (also called a **<u>carbonyl group</u>**) is characteristic of both of these types of compounds. The difference is:



The aldehyde group is at the end of a chain (also written -CHO)
d one R group attached)

n an end
groups attached)

a. **ALDEHYDES - THE DOUBLE-BONDED "O's " AT THE END OF THE CHAIN GANG**

Never use address numbers for the position of the double-bonded O's
Name the substituents just like you do for alkanes and alcohols, also, give them address numbers with the carbon having the double-bonded O counted as # 1. A good example is:

7-isopropyl decanal

$CH_3CH_2CH_2CHCH_2CH_2CH_2CH_2CH_2CHO$
|
CH_3CHCH_3

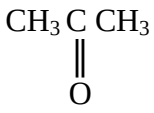
Notice there is no number to indicate the position of the carbon that is double-bonded O (carbonyl group), because the carbonyl group is **<u>always at the end of the chain and is always referred to as carbon #1</u>**.

b. **KETONES - THE DOUBLE- BONDED "O's " <u>NOT</u> AT THE END OF THE CHAIN GANG**

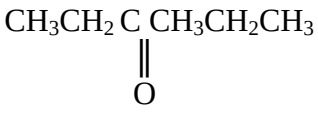
Never use address numbers for the position of the double-bonded O's (the carbonyl group)
Name the substituents just like you do in alkanes but they do not have address numbers. You must always have 2 substituents and they are on either side of the carbon with the double-bonded O (carbonyl group). Some typical names would be: Methyl ethyl ketone, and the examples below.

Examples:

dimethyl ketone (also called **acetone**),



ethyl propyl ketone



For our tests, don't worry about the other 2 ways of naming ketones. Notice the substituents are both connected to the carbon that is double-bonded to the O (the carbonyl group) and that the **carbonyl group is not on the end of a chain**.

After checking out the textbook, if you still want more background for understanding Aldehydes and ketones, here are three good web sites:

Aldehyde background & neat little models (Chime needed)
Tutorial on Aldehydes with molecules that rotate (McGraw-Hill)

Ketone background & neat little models (Chime needed)
Tutorial on Ketones with molecules that rotate (McGraw-Hill)

Aldehyde & Ketone
Tutorial on Aldehydes & Ketones (McGraw-Hill)