Take notes while watching the following video tutorials to prepare for the "Hydrocarbon Nomenclature Activity".

#### Naming Hydrocarbons

IVPAC = International Union of Pure & Applied Chemistry

There are 4 types of hydrocarbons.



Alkanes are \_\_\_\_\_\_ hydrocarbons (aliphatic).

Alkenes, alkynes, and aromatics are \_\_\_\_\_\_ hydrocarbons

Names have 3 parts:

Straight chains are named using the root names from the homologous series.

Cycloalkanes are named using the same root names with the additional prefix "cyclo".

Alkane names end with the suffix "ane".

Alkene names end with the suffix "ene".

Alkynes end with the suffix "yne".

# C′s	Alkane Structure	Suffix name	Substituent name
1		methane	methyl
2		ethane	ethyl
3		propane	propyl
4		butane	butyl
5		pentane	pentyl
6		hexane	hexyl
7		heptane	heptyl
8		octane	octyl
9		nonane	nonyl
10		decane	decyl

# Root Names – the Homologous Series

#### -CH<sub>2</sub>-

### -CH<sub>2</sub>CH<sub>2</sub>-

-CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-

## Guidelines for Naming Straight-Chain Hydrocarbons and Cycloalkanes

	Rule 1:	Assign the root by counting the carbon atoms in the chain.
	Rule 2:	Assign the suffix.
	Rule 3:	Assign a locator number to the root if a multiple-bond is present. The multiple-bond is ALWAYS assigned the lowest possible number.
	Rule 4:	For cycloalkanes and alkenes, assign the cis or trans prefix if applicable.
Draw the skeletal-line structure for each of the following compounds.		

- a) trans-2-hexene
- b) 3-octyne
- c) cyclopentane

Give the IVPAC name for the following compounds.



Naming Branched-Chain Hydrocarbons

Main Chain: the longest continuous C-chain

Substituents: the carbon branches from the main chain (root)

Guidelines for Naming Branched-Chain Hydrocarbons

Rule 1: Find the longest continuous C-chain and assign the root name.



Rule 2: Assign the suffix based on the type of carbon-carbon bonds

Rule 3: Name each substituent.



Rule 4: Assign a locator number to all substituents. Double & triple bonds are assigned the lowest possible number. If there are no C=C or C=C bonds, then the main chain is numbered to give the first branch the lowest possible number.

Rule 5: Assemble the prefix name by listing the substituents in alphabetical order. Place the locator number in front of each substituent name separated by a hyphen.

If a substituent is repeated more than once along a chain, then insert an additional prefix di- (2), tri- (3), or tetra- (4) in front.

Rule 6: For cycloalkanes and alkenes, assign the cis or trans prefix if applicable.

Give the IVPAC for the following compound.

Draw the skeletal-line structure for each of the following compounds.

a) cis-4-ethyl-2-hexene

b) trans-1-ethyl-3-methylcyclohexane

Give the IVPAC name for the following compounds.





### Guidelines for Naming Substituted Benzenes

- Rule 1: Assign the root name.
- Rule 2: Name each substituent.
- Rule 3: If there is more than one substituent present, then we number the benzene ring to give the 2<sup>nd</sup> substituent the lowest possible number. The first substituent is always given the number 1.
- Rule 4: Assemble the prefix name by listing the substituents in alphabetical order. Place the locator number in front of each substituent name separated by a hyphen.

If a substituent is repeated more than once along a chain, then insert an additional prefix di- (2), tri- (3), or tetra- (4) in front.

Memorize the following common benzene derivatives.



Draw the skeletal-line structure for 3-propylphenol.

Give the IVPAC name for  $C_6H_5CH_2CH_2CH_2CH_3$ .

Hydrocarbons Part 4: Structure & IUPAC Nomenclature Review

Hydrocarbon Structure & Nomenclature Review



Complete the table.

	Skeletal-line	Condensed Structure
IVPAC Name	Structure	
4-ethyl-2-methyloctane		
	CH3	
		CH3CH2CH2CH(CH3)CH3
cis-6-ethyl-7-methyl- 3-octene		
		$CH_2=C(CH_3)CH_2CH_3$