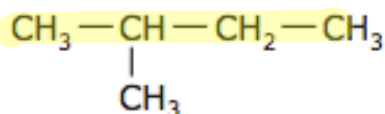


1. Naming & Drawing Alkanes (single bond)
2. Naming & Drawing Alkenes (double bond)
3. Naming & Drawing Alkynes (triple bond)
4. Cis & Trans Isomers

Alkanes

Steps to Naming Simple Alkanes:

1. Find the longest continuous chain of carbon atoms. It does not have to be in a straight line. This is called the "parent chain"

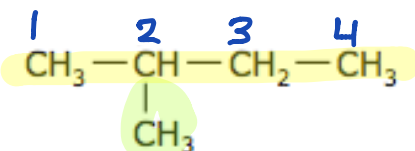


The longest continuous chain of carbon atoms contains 4 carbon atoms

State the number of carbon atoms using the appropriate prefix and the ending "ane."

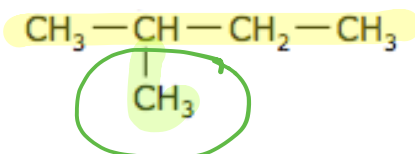
The appropriate prefix would be but- and with the ending "ane" would be butane.

2. Branches are called "alkyl" groups. Number the carbon atoms in the parent chain starting at the end closest to the branches.



3. Name each branch.

- Give a prefix according to the number of carbon atoms the branch contains. Branch names end in "yl" instead of "ane"



Circle the alkyl branch. The name of this branch is methyl.

- If there are multiple branches, list them in alphabetical order
- If there are multiples of the same branches, use the following prefixes:

Di = 2  
Tri = 3  
Tetra = 4

\*prefixes don't count toward  
alpha order

4. State the name of the alkane by naming each branch, then naming the parent

- Use commas between numbers
- Use hyphens between numbers & branches

ex. 2-methylbutane

### Practice #1.

1. Parent Chain.

Pentane

2. Number the parent chain.

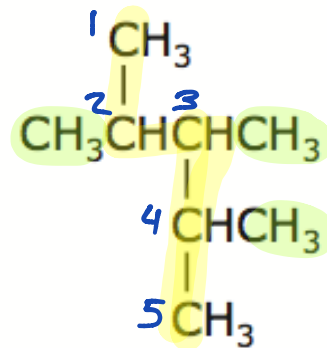
✓

3. Name the branches.

trimethyl

4. Name the compound

2,3,4-trimethylpentane



### Practice #2.

1. Parent Chain.

Pentane

2. Number the parent chain.

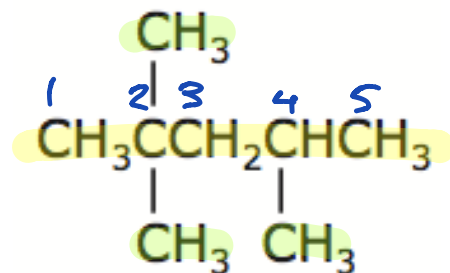
✓

3. Name the branches.

trimethyl

4. Name the compound

2,2,4-trimethylpentane



\*We want lowest numbers possible

### Complete Worksheet on Alkanes

#### Alkenes

• Hydrocarbons containing double bonds

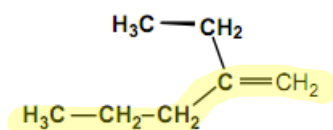
• General Formula:  $C_nH_{2n}$

• They are unsaturated - the double bond is a reactive site for other atoms to bond to the carbon atom

# of C Atoms	Prefix	Alkene	Formula
1	Meth-	Not possible	
2	Eth-	<u>ethene</u>	$C_2H_4$
3	Prop-	<u>propene</u>	$C_3H_6$
4	But-	<u>butene</u>	$C_4H_8$
5	Pent-	<u>pentene</u>	$C_5H_{10}$
6	Hex-	<u>hexene</u>	$C_6H_{12}$
7	Hept-	<u>heptene</u>	$C_7H_{14}$
8	Oct-	<u>octene</u>	$C_8H_{16}$
9	Non-	<u>nonene</u>	$C_9H_{18}$
10	Dec-	<u>decene</u>	$C_{10}H_{20}$

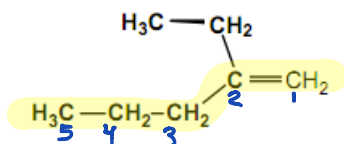
### Steps to Naming Alkenes:

- The parent chain must contain the double bond (even if it's not the longest chain!)



The longest continuous chain of carbon atoms including the double bond contains 5 carbon atoms

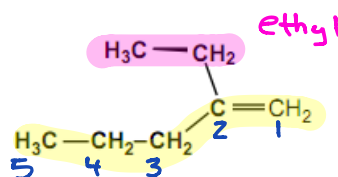
- The parent chain carbon atoms are numbered starting at the end closest to the double bond. The position of the double bond is indicated in the name by stating the number of the carbon atom that the double bond follows



The double bond follows carbon # 1.

The parent chain is called 1-pentene.

- Name the branches



4. Name the compound

2-ethyl-1-pentene

---

Practice #1.

1. Parent Chain.

hexene

2. Number the parent chain.

✓

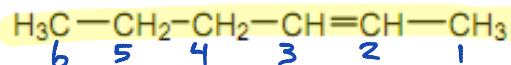
3. Name the branches.

N/A

4. Name the compound

2-hexene

---



Practice #2.

1. Parent Chain.

pentene

2. Number the parent chain.

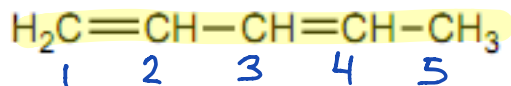
✓

3. Name the branches.

N/A

4. Name the compound

1,3-pentadiene



Alkynes

• Hydrocarbons containing triple bonds

• General Formula  $\text{C}_n\text{H}_{2n-2}$

• They are unsaturated - the triple bond is a very reactive site for other atoms to bond to.

Steps to Naming Alkynes:

• The same rules for naming an alkene apply - however the ending is "-yne" instead of "-ene"

# of C Atoms	Prefix	Alkyne
1	Meth-	not possible
2	Eth-	ethyne
3	Prop-	propyne
4	But-	butyne
5	Pent-	pentyne
6	Hex-	hexyne
7	Hept-	heptyne
8	Oct-	octyne
9	Non-	nonyne
10	Dec-	decyne

### Practice #1.

1. Parent Chain.

pentyne

2. Number the parent chain.

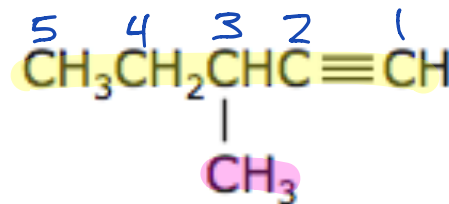
✓

3. Name the branches.

3-methyl

4. Name the compound

3-methyl-1-pentyne



### Practice #2.

1. Parent Chain.

hexyne

2. Number the parent chain.

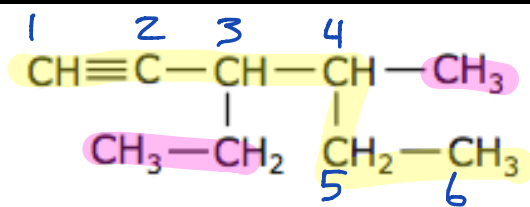
✓

3. Name the branches.

3-ethyl 4-methyl

4. Name the compound

3-ethyl-4-methyl-1-hexyne



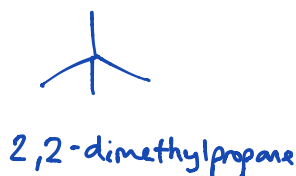
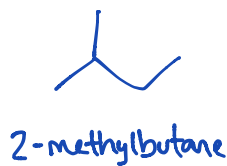
### Complete Worksheet on Alkenes and Alkynes

#### Cis & Trans Isomers

#### What is an ISOMER?

- Same formula but different arrangement.

- Example:  $C_5H_{12}$



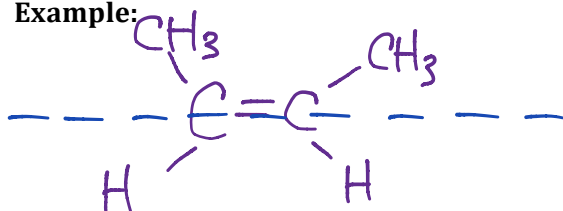
A special type of isomerism, called cis-trans isomerism, occurs when a molecule has:

- a double bond is present and
- groups attached to the carbons involved in the double bond (not H's)

Cis:

- the two groups are on the same side

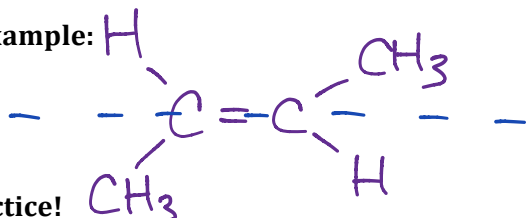
- Example:



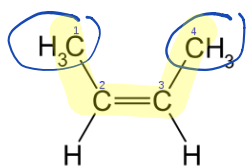
Trans:

- the two groups are on opposite sides

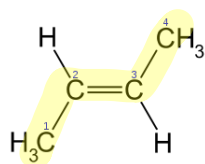
- Example:



Let's practice!



cis-2-butene



trans-2-butene