**Memorize These From Last Year:**





|  |  |
| --- | --- |
| F | Fluoro |
| Cl | Chloro |
| Br | Bromo |
| I | Iodo |
| NH3 | Amino |
| NO2 | Nitro |

|  |  |
| --- | --- |
| 2 | Di |
| 3 | **Tri** |
| 4 | **Tetra** |
| 5 | **Penta** |
| 6 | **Hexa** |
| 7 | **Hepta** |
| 8 | **Octa** |
| 9 | **Nona** |
| 10 | **Deca** |

**Video 10.1 Hydrocarbons**

1. How many carbon atoms are in each compound?
   1. Methane \_\_\_\_
   2. Ethane \_\_\_\_
   3. Ethene \_\_\_\_
   4. Pentane \_\_\_\_
   5. Propene \_\_\_\_
   6. Hexane \_\_\_\_
   7. Ethyne \_\_\_\_
   8. Propane \_\_\_\_
   9. Heptane \_\_\_\_
   10. Octane \_\_\_\_
   11. Decane \_\_\_\_
   12. Butyne \_\_\_\_
   13. Butane \_\_\_\_
   14. Propyne \_\_\_\_
   15. Butene \_\_\_\_
2. How many times does carbon bond and why?
3. For each of the following, draw the structural formula and then name the compound.
   1. C2H6 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. C5H10 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. C6H12 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. C7H12 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. C9H20 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   6. C2H2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   7. C8H16 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   8. C4H8 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   9. C10H18 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   10. C5H8 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   11. C6H14 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   12. C9H16 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. For each of the following determine the name.
   1. CH4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. C10H20 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. C3H4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. C8H18 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. C5H12 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   6. C9H18 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   7. C2H6 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   8. C4H6 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   9. C7H16 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   10. C6H12 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Create a rule to determine an easy way to find the homologous series to which a compound belongs.

**Video 10.2 Branched and Cyclic Hydrocarbons**

1. What element bonds four times, often to atoms of itself, in branches and rings? \_\_\_\_\_\_\_\_\_\_\_\_\_
2. Draw the following cyclic compounds:

**Cyclobutane Cyclopentane Cyclohexane**

**Cyclobutene 1, 3 Cyclohexadiene 1, 4 Cyclooctyne**

**1, 3 Cycloheptadiene 1, 3, 5 Cyclohexatriene Benzene**

1. What prefix do most cyclic hydrocarbons have in common? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is another name for benzene? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Draw the following branched hydrocarbons:

**2-methyl butane 3-ethyl hexane**

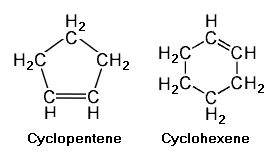
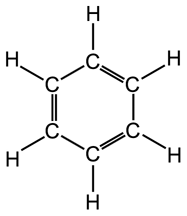
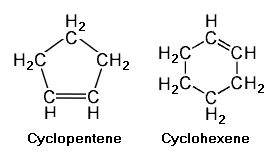
**2, 3-dimethyl pentane 4-methyl, 3-ethyl 1-octyne**

**2, 5 dimethyl 3 nonyne 8, 8, 9-trimethyl 2, 4, 6-decatriene**

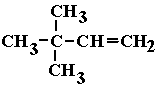
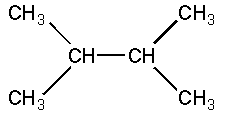
1. What do the numbers before the last name represent? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Why can’t any names start with a 1? (Hint: draw 1-methyl butane) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

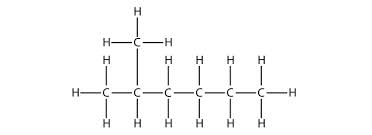
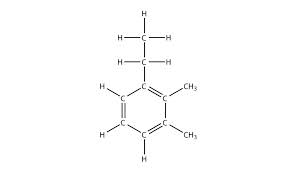
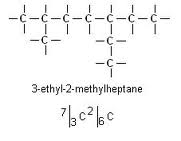
1. Name the following compounds:

**  **

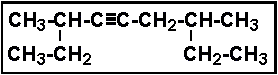
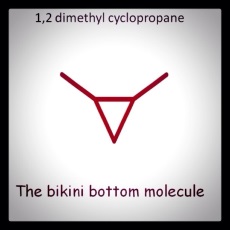
**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**  **

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**  **

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **

**Video 10.3 Isomers**

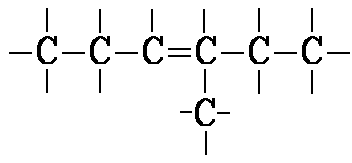
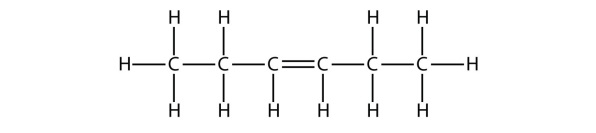
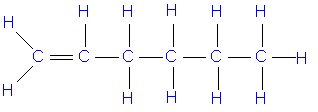
1. Record the Structural formula, molecular formula, and condensed formula for the following:

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Structural** | **Molecular** | **Condensed** |
| 2, 3-dimethyl butane |  |  |  |
| 2, 2-dimethyl butane |  |  |  |
| 2-heptyne |  |  |  |
| 3-hexene |  |  |  |
| 2-methyl  1-pentene |  |  |  |

1. Where any of the above isomers? Explain your answer. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Draw an isomer of 2-heptyne below. Give the name of your isomer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Name the following and identify the isomers.

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. Which of the hydrocarbons in the table above were saturated?

**Video 10.4 Functional Groups (Memorize)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Functional Group** | **How to name** | **Draw the example on the reference table** | **Properties** |
| **Alcohol** |  |  |  | Soluble, flammable |
| **Ether** |  |  |  | Soluble, anesthetic (puts you to sleep) |
| **Aldehyde** |  |  |  | Soluble, reactive, formaldehyde (methanal) is used to preserve specimens. |
| **Keytone** |  |  |  | Somewhat soluble, needs at least 3 C, acetone (propanone) is nail polish remover |
| **Acid** |  |  |  | Weak acids, aka carboxylic acids. |
| **Ester** |  |  |  | Smell great, used in perfumes and found in fruits. |
| **Amine** |  |  |  | Used in dyes, found in DNA |
| **Polymer** |  |  |  | Used in plastics |
| **Amide**  **`** |  |  |  | Used in dyes |

For each of the following identify the functional group and then name the compound.

|  |  |  |
| --- | --- | --- |
| Functional Group: \_\_\_\_\_\_\_\_\_\_\_\_\_  Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Functional Group: \_\_\_\_\_\_\_\_\_\_\_\_\_  Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Functional Group: \_\_\_\_\_\_\_\_\_\_\_\_\_  Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Functional Group: \_\_\_\_\_\_\_\_\_\_\_\_\_  Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Functional Group: \_\_\_\_\_\_\_\_\_\_\_\_\_  Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Functional Group: \_\_\_\_\_\_\_\_\_\_\_\_\_  Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Functional Group: \_\_\_\_\_\_\_\_\_\_\_\_\_  Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Functional Group: \_\_\_\_\_\_\_\_\_\_\_\_\_  Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Functional Group: \_\_\_\_\_\_\_\_\_\_\_\_\_  Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Functional Group: \_\_\_\_\_\_\_\_\_\_\_\_\_  Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Functional Group: \_\_\_\_\_\_\_\_\_\_\_\_\_  Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Functional Group: \_\_\_\_\_\_\_\_\_\_\_\_\_  Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

For the following compounds, determine the family and draw the compound:

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Family** | **Structural Formula** | **Condensed Formula** |
| Butanoic acid |  |  |  |
| Methanal |  |  |  |
| Butanamide |  |  |  |
| 3-iodo octane |  |  |  |
| Methyl pentanoate |  |  |  |
| Ethanol |  |  |  |
| 2-heptanone |  |  |  |
| Diethyl ether |  |  |  |
| 2-pentanol |  |  |  |
| Ethanoic acid |  |  |  |
| 2-propanamine |  |  |  |
| Hexanal |  |  |  |
| Ethyl methanoate |  |  |  |

Video 10.5 Organic Reactions (Memorize)

|  |  |  |
| --- | --- | --- |
|  | **Notes (in red on ppt)** | **Example** |
| **Addition**  (like synthesis) |  | C2H4 + Br2 🡪 C2H4Br2 |
| **Substitution**  (like SR) |  | CH4 + Br2 🡪 CH3Br + HBr |
| **Combustion** |  | CH4 + 2O2 🡪 CO2 + 2H20 |
| **Esterification** |  | C3H6COOH + C2H5OH 🡪 C3H6COOC2H5 + H2O |
| **Fermentation** |  | C6H12O6🡪 C2H5OH +CO2 |
| **Saponification** |  | https://encrypted-tbn3.gstatic.com/images?q=tbn:ANd9GcSDVNI5hSrpz1cLoKT6E8Avrj5ur5mzVMtSWZqREL0X2GwFZBUZ |
| **Polymerization** |  | Ethene_polymerization.png |
| **Cracking** |  | cracking.jpg |

**Match the reaction to its name:**

\_\_\_ 1. Addition a. C13H28 🡪 C8H18 + C2H4 + C3H6

\_\_\_ 2. Substitution b. C3H8 + 5O2 🡪 3CO2 + 4H20

\_\_\_ 3. Combustion c. (C17H35COO)3C3H5 + 3 NaOH 🡪 C3H5(OH)3 + 3C17H35COONa

\_\_\_ 4. Cracking d. C6H12O6🡪 C2H5OH +CO2

\_\_\_ 5. Polymerization e. n(CH2CH2) 🡪 (CH2CH2)n

\_\_\_ 6. Fermentation f. C2H6 + Cl2 🡪 C2H5Cl + HCl

\_\_\_ 7. Esterification g. C3H6COOH + C2H5OH 🡪 C3H6COOC2H5 + H2O

\_\_\_ 8. Saponification h. C3H6 + I2 🡪 C3H6I2

**Name the reaction:**

1. A saturated alkane reacts with fluorine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Small alkene chains connect to form larger alkane chains \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Sugar is decomposed to form an alcohol \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Large hydrocarbons are heated and break into smaller fragments \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. An unsaturated hydrocarbon reacts with bromine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. An alcohol and an organic acid are reacted \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. A base is added to a fat molecule to form a soap \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. Hydrocarbons are burned in the presence of oxygen \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. Another name for hydrogenation\* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. Another name for halogenation\* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Draw all organic reactants and products. Then name and give the formula for the missing substance in the reaction. Give the reaction type.**

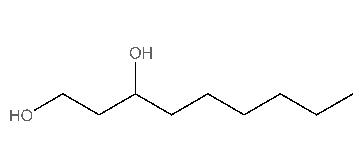
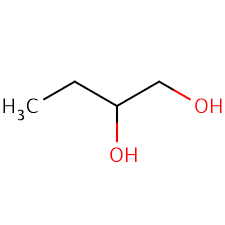
1. C2H4 + F2 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Rxn: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. C3H6 + H2 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Rxn: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. C2H6 + Cl2 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + HCl Rxn: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. C4H10 + Br2 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + HBr Rxn: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. CH4 + O2 🡪 \_\_\_\_\_\_ + H2O Rxn: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. C3H8 + O2 🡪 CO2 + \_\_\_\_\_\_ Rxn: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. C6H12O6 🡪 2CO2 + 2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Rxn: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. C8H18 🡪 C6H12 + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Rxn: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. C2H5OH + C3H7COOH 🡪 H2O + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Rxn: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. C5H10 + F2 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Rxn: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Video 10.6 AP Extension**

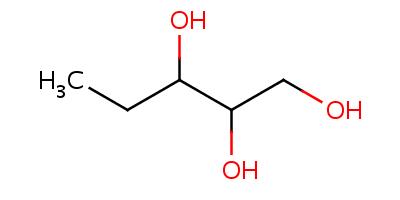
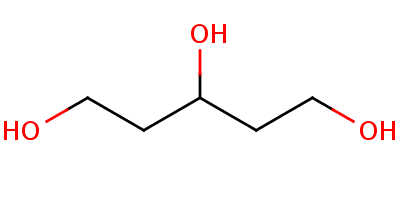
1. Draw the following:

|  |  |  |
| --- | --- | --- |
| o-methyl benzene | p-nitro benzene | m-ethyl benzene |
| p-fluorobenzene | m-aminobenzene | Cis-2-butene |
| Cis-3-hexene | Trans-4-octene | Trans-2-butene |
| Acetone | Acetic acid | acetaldehyde |
| Formaldehyde | Formic acid | 2,3 propantriol |

1. Label the following as dihydroxy or trihydroxy alcohols:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Explain the difference between primary, secondary, and tertiary alcohols:

