

WRITING BINARY FORMULAS

Name _____

Write the formulas for the compounds formed from the following ions.

- | | |
|--|--|
| 1. Na^+ , Cl^- <u>NaCl</u> | 11. Fe^{+2} , O^{-2} <u>FeO</u> |
| 2. Ba^{+2} , F^- <u>BaF_2</u> | 12. Fe^{+3} , O^{-2} <u>Fe_2O_3</u> |
| 3. K^+ , S^{-2} <u>K_2S</u> | 13. Cr^{+2} , S^{-2} <u>CrS</u> |
| 4. Li^+ , Br^- <u>LiBr</u> | 14. Cr^{+3} , S^{-2} <u>Cr_2S_3</u> |
| 5. Al^{+3} , I^- <u>AlI_3</u> | 15. Cu^+ , Cl^- <u>CuCl</u> |
| 6. Zn^{+2} , S^{-2} <u>ZnS</u> | 16. Cu^{+2} , Cl^- <u>CuCl_2</u> |
| 7. Ag^+ , O^{-2} <u>Ag_2O</u> | 17. Pb^{+2} , O^{-2} <u>PbO</u> |
| 8. Mg^{+2} , P^{-3} <u>Mg_3P_2</u> | 18. Pb^{+4} , O^{-2} <u>PbO_2</u> |
| 9. Ni^{+2} , O^{-2} <u>NiO</u> | 19. Mn^{+2} , Br^- <u>MnBr_2</u> |
| 10. Ni^{+3} , O^{-2} <u>Ni_2O_3</u> | 20. Mn^{+4} , Br^- <u>MnBr_4</u> |

NAMING BINARY COMPOUNDS (IONIC)

Name _____

Name the following ionic compounds using Roman numerals where necessary.

1. BaCl_2 barium chloride

11. K_2S potassium sulfide

2. NaF sodium fluoride

12. CrCl_2 chromium (II) chloride

* 3. Ag_2O silver oxide

13. CrCl_3 chromium (III) chloride

4. CuBr copper (I) bromide

14. CaO calcium oxide

5. CuBr_2 copper (II) bromide

15. Ba_3P_2 barium phosphide

6. FeO iron (II) oxide

16. Hg_2I_2 mercury (I) iodide

7. Fe_2O_3 iron (III) oxide

17. Na_2O sodium oxide

8. MgS magnesium sulfide

18. BeS beryllium sulfide

9. Al_2O_3 aluminum oxide

19. MnO manganese (II) oxide

10. CaI_2 calcium iodide

20. Mn_2O_3 manganese (III) oxide

FORMULAS WITH POLYATOMIC IONS

Name _____

Matching the horizontal and vertical axes, write the formulas of the compounds with the following combination of ions. The first one is done for you.

	OH^-	NO_3^-	CO_3^{2-}	SO_4^{2-}	PO_4^{3-}
H^+	HOH (H_2O)	HNO_3	H_2CO_3	H_2SO_4	H_3PO_4
Na^+	NaOH	NaNO_3	Na_2CO_3	Na_2SO_4	Na_3PO_4
Mg^{+2}	$\text{Mg}(\text{OH})_2$	$\text{Mg}(\text{NO}_3)_2$	MgCO_3	MgSO_4	$\text{Mg}_3(\text{PO}_4)_2$
NH_4^+	NH_4OH	NH_4NO_3	$(\text{NH}_4)_2\text{CO}_3$	$(\text{NH}_4)_2\text{SO}_4$	$(\text{NH}_4)_3\text{PO}_4$
Ca^{+2}	$\text{Ca}(\text{OH})_2$	$\text{Ca}(\text{NO}_3)_2$	CaCO_3	CaSO_4	$\text{Ca}_3(\text{PO}_4)_2$
K^+	KOH	KNO_3	K_2CO_3	K_2SO_4	K_3PO_4
Al^{+3}	$\text{Al}(\text{OH})_3$	$\text{Al}(\text{NO}_3)_3$	$\text{Al}_2(\text{CO}_3)_3$	$\text{Al}_2(\text{SO}_4)_3$	AlPO_4
Pb^{+4}	$\text{Pb}(\text{OH})_4$	$\text{Pb}(\text{NO}_3)_4$	$\text{Pb}(\text{CO}_3)_2$	$\text{Pb}(\text{SO}_4)_2$	$\text{Pb}_3(\text{PO}_4)_4$

NAMING OF NON-BINARY COMPOUNDS

Name _____

An ionic compound that contains more than two elements must contain a polyatomic ion. Name the following compounds.

- demo ✓ 1. NaNO_3 sodium nitrate
- ✓ 2. Ca(OH)_2 calcium hydroxide
3. K_2CO_3 potassium carbonate
- ✓ 4. NH_4Cl ammonium chloride
5. MgSO_4 magnesium sulfate
6. AlPO_4 aluminum phosphate
7. $(\text{NH}_4)_2\text{SO}_4$ ammonium sulfate
8. Na_3PO_4 sodium phosphate
- ✓ 9. CuSO_4 copper (II) sulfate
10. NH_4OH ammonium hydroxide
11. Li_2SO_3 lithium sulfite
- demo Mn(NO₃)₂ 12. $\text{Mg(NO}_3)_2$ magnesium nitrate
13. Al(OH)_3 aluminum hydroxide
14. $(\text{NH}_4)_3\text{PO}_4$ ammonium phosphate
15. KOH potassium hydroxide
16. $\text{Ca(NO}_3)_2$ calcium nitrate
17. K_2SO_4 potassium sulfate
18. Pb(OH)_2 lead (II) hydroxide
- ✓ 19. Na_2O_2 sodium peroxide
20. CuCO_3 copper (II) carbonate

Naming Ionic Compounds – Answer Key

Give the name and molar mass of the following ionic compounds:

		Name	Molar Mass
1)	Na_2CO_3	sodium carbonate	129 grams/mole
2)	NaOH	sodium hydroxide	40 grams/mole
3)	MgBr_2	magnesium bromide	184.1 grams/mole
4)	KCl	potassium chloride	74.6 grams/mole
5)	FeCl_2	iron (II) chloride	126.5 grams/mole
6)	FeCl_3	iron (III) chloride	162.3 grams/mole
7)	Zn(OH)_2	zinc hydroxide	99.4 grams/mole
8)	Be_2SO_4	beryllium sulfate	114.1 grams/mole
9)	CrF_2	chromium (II) fluoride	90.0 grams/mole
10)	Al_2S_3	aluminum sulfide	177.3 grams/mole
11)	PbO	lead (II) oxide	223.2 grams/mole
12)	Li_3PO_4	lithium phosphate	115.7 grams/mole
13)	TiI_4	titanium (IV) iodide	552.3 grams/mole
14)	Co_3N_2	cobalt (II) nitride	204.7 grams/mole
15)	Mg_3P_2	magnesium phosphide	134.9 grams/mole
16)	$\text{Ga(NO}_2)_3$	gallium nitrite	207.7 grams/mole
17)	Ag_2SO_3	silver sulfite	311.9 grams/mole
18)	NH_4OH	ammonium hydroxide	35.0 grams/mole
19)	Al(CN)_3	aluminum cyanide	105.0 grams/mole
20)	$\text{Be(CH}_3\text{COO)}_2$	beryllium acetate	127.0 grams/mole

For the following compounds, give the formulas and the molar masses:

		Formula	Molar Mass
22)	sodium phosphide	Na₃P Na₃P	134.0 grams/mole
23)	magnesium nitrate	Mg(NO ₃) ₂	86.3 grams/mole
24)	lead (II) sulfite	PbSO ₃	287.3 grams/mole
25)	calcium phosphate	Ca ₃ (PO ₄) ₂	310.3 grams/mole
26)	ammonium sulfate	(NH ₄) ₂ SO ₄	132.1 grams/mole
(27)	silver cyanide	AgCN	133.9 grams/mole
28)	aluminum sulfide	Al ₂ S ₃	150.3 grams/mole
29)	beryllium chloride	BeCl ₂	80.0 grams/mole
30)	copper (I) arsenide	Cu ₃ As	265.4 grams/mole
31)	iron (III) oxide	Fe ₂ O ₃	159.6 grams/mole
32)	gallium nitride	GaN	83.7 grams/mole
33)	iron (II) bromide	FeBr ₂	215.6 grams/mole
34)	vanadium (V) phosphate	V ₃ (PO ₄) ₅	627.7 grams/mole
35)	calcium oxide	CaO	56.1 grams/mole
36)	magnesium acetate	Mg(CH ₃ COO) ₂	142.3 grams/mole
37)	aluminum sulfate	Al ₂ (SO ₄) ₃	342.3 grams/mole
38)	copper (I) carbonate	Cu ₂ CO ₃	187.0 grams/mole
39)	barium oxide	BaO	153.3 grams/mole
40)	ammonium sulfite	(NH ₄) ₂ SO ₃	116.1 grams/mole
41)	silver bromide	AgBr	187.8 grams/mole
42)	lead (IV) nitrite	Pb(NO ₂) ₄	391.2 grams/mole

NAMING IONIC COMPOUNDS

Name _____

Name the following compounds using the Stock Naming System.

- | | |
|--|-------------------------------|
| 1. CaCO_3 | <u>calcium carbonate</u> |
| 2. KCl | <u>potassium chloride</u> |
| 3. FeSO_4 | <u>iron (II) sulfate</u> |
| 4. LiBr | <u>lithium bromide</u> |
| 5. MgCl_2 | <u>magnesium chloride</u> |
| 6. FeCl_3 | <u>iron (III) chloride</u> |
| 7. $\text{Zn}_3(\text{PO}_4)_2$ | <u>zinc phosphate</u> |
| 8. NH_4NO_3 | <u>ammonium nitrate</u> |
| 9. $\text{Al}(\text{OH})_3$ | <u>aluminum hydroxide</u> |
| 10. $\text{CuC}_2\text{H}_3\text{O}_2$ | <u>copper(I) acetate</u> |
| 11. PbSO_3 | <u>lead (II) sulfite</u> |
| 12. NaClO_3 | <u>sodium chlorate</u> |
| 13. CaC_2O_4 | <u>calcium oxalate</u> |
| 14. Fe_2O_3 | <u>iron (III) oxide</u> |
| 15. $(\text{NH}_4)_3\text{PO}_4$ | <u>ammonium phosphate</u> |
| 16. NaHSO_4 | <u>sodium bisulfate</u> |
| 17. Hg_2Cl_2 | <u>mercury (I) chloride</u> |
| 18. $\text{Mg}(\text{NO}_2)_2$ | <u>magnesium nitrite</u> |
| 19. CuSO_4 | <u>copper (II) sulfate</u> |
| 20. NaHCO_3 | <u>sodium bicarbonate</u> |
| 21. NiBr_3 | <u>nickel bromide</u> |
| 22. $\text{Be}(\text{NO}_3)_2$ | <u>beryllium nitrate</u> |
| 23. ZnSO_4 | <u>zinc sulfate</u> |
| 24. AuCl_3 | <u>gold chloride</u> |
| 25. KMnO_4 | <u>potassium permanganate</u> |

NAMING MOLECULAR COMPOUNDS

Name _____

Name the following covalent compounds.

1. CO_2 carbon dioxide
2. CO carbon monoxide
3. SO_2 sulfur dioxide
4. SO_3 sulfur trioxide
- ✓ 5. N_2O dinitrogen monoxide
- ✓ 6. NO nitrogen monoxide
- ✓ 7. N_2O_3 dinitrogen trioxide
- ✓ 8. NO_2 nitrogen dioxide
9. N_2O_4 dinitrogen tetroxide
10. N_2O_5 dinitrogen pentoxide
11. PCl_3 phosphorus trichloride
12. PCl_5 phosphorus pentachloride
- ★ 13. NH_3 ammonia
14. SCl_6 sulfur hexachloride
15. P_2O_5 diphosphorus pentoxide
16. CCl_4 carbon tetrachloride
17. SiO_2 silicon dioxide
18. CS_2 carbon disulfide
19. OF_2 oxygen difluoride
20. PBr_3 phosphorus tribromide

WRITING FORMULAS FROM NAMES

Name _____

Write the formulas for the following compounds.

- | | |
|--|---|
| 1. carbon monoxide | <u>CO</u> |
| 2. sodium chloride | <u>NaCl</u> |
| 3. carbon tetrachloride | <u>CCl₄</u> |
| 4. magnesium bromide | <u>MgBr₂</u> |
| 5. aluminum iodide | <u>AlI₃</u> |
| 6. hydrogen hydroxide | <u>HOH or H₂O</u> |
| 7. iron (II) fluoride | <u>FeF₂</u> |
| 8. carbon dioxide | <u>CO₂</u> |
| 9. sodium carbonate | <u>Na₂CO₃</u> |
| 10. ammonium sulfide | <u>(NH₄)₂S</u> |
| 11. iron (II) oxide | <u>FeO</u> |
| 12. iron (III) oxide | <u>Fe₂O₃</u> |
| 13. magnesium sulfate | <u>MgSO₄</u> |
| 14. sodium phosphate | <u>Na₃PO₄</u> |
| 15. dinitrogen pentoxide | <u>N₂O₅</u> |
| 16. phosphorus trichloride | <u>PCl₃</u> |
| 17. aluminum sulfite | <u>Al₂(SO₃)₃</u> |
| 18. copper (I) carbonate | <u>Cu₂CO₃</u> |
| 19. potassium hydrogen ^{bi} carbonate | <u>KHCO₃</u> |
| 20. sulfur trioxide | <u>SO₃</u> |

NAMING COMPOUNDS (MIXED)

Name _____

Name the following compounds.

1. NaCl sodium chloride
2. MnS manganese (II) sulfide
3. K_2O potassium oxide
4. CuBr_2 copper (II) bromide
5. CuBr copper (I) bromide
6. CO_2 carbon dioxide
7. PbSO_4 lead (II) sulfate
8. Li_2CO_3 lithium carbonate
9. Na_2CO_3 sodium carbonate
10. NO_2 nitrogen dioxide
11. N_2O_4 dinitrogen tetroxide
12. Ca(OH)_2 calcium hydroxide
13. NH_4Cl ammonium chloride
14. SO_3 sulfur trioxide
15. AlPO_4 aluminum phosphate
16. CCl_4 carbon tetrachloride
17. CaS calcium sulfide
18. NH_3 ammonia
19. MgI_2 magnesium iodide
20. K_3PO_4 potassium phosphate

Acid Nomenclature Worksheet

Name _____

Write the formula for each of the acids listed below:

1. Nitric acid HNO_3
2. Chloric acid HClO_3
3. Acetic acid $\text{HC}_2\text{H}_3\text{O}_2$
4. Hydrobromic acid HBr
5. Sulfurous acid H_2SO_3
6. Chlorous acid HClO_2
7. Hydrochloric acid HCl
8. Phosphoric acid H_3PO_4
9. Nitrous acid HNO_2
10. Hydrofluoric acid HF
11. Perchloric acid HClO_4
12. Hydroiodic acid HI
13. Phosphorous acid H_3PO_3
14. Carbonic acid H_2CO_3
15. Sulfuric acid H_2SO_4

Name each of the following acids:

- | | | |
|-----|-----------------------------------|--------------------------|
| 16. | HClO_4 | <u>perchloric acid</u> |
| 17. | H_3PO_4 | <u>phosphoric acid</u> |
| 18. | HCl | <u>hydrochloric acid</u> |
| 19. | H_2SO_4 | <u>sulfuric acid</u> |
| 20. | HNO_2 | <u>nitrous acid</u> |
| 21. | HI | <u>hydroiodic acid</u> |
| 22. | $\text{HC}_2\text{H}_3\text{O}_2$ | <u>acetic acid</u> |
| 23. | HF | <u>hydrofluoric acid</u> |
| 24. | H_3PO_3 | <u>phosphorous acid</u> |
| 25. | HClO_3 | <u>chloric acid</u> |
| 26. | H_2CO_3 | <u>carbonic acid</u> |
| 27. | H_2SO_3 | <u>sulfurous acid</u> |
| 28. | HClO_2 | <u>chlorous acid</u> |
| 29. | HNO_3 | <u>nitric acid</u> |
| 30. | HBr | <u>hydrobromic acid</u> |

NAMING ACIDS

Name _____

Name the following acids.

- | | |
|--------------------------------------|----------------------|
| 1. HNO_3 | <u>nitric</u> |
| 2. HCl | <u>hydrochloric</u> |
| 3. H_2SO_4 | <u>sulfuric</u> |
| 4. H_2SO_3 | <u>sulfurous</u> |
| 5. $\text{HC}_2\text{H}_3\text{O}_2$ | <u>acetic</u> |
| 6. HBr | <u>hydrobromic</u> |
| 7. HNO_2 | <u>nitrous</u> |
| 8. H_3PO_4 | <u>phosphoric</u> |
| 9. H_2S | <u>hydrosulfuric</u> |
| 10. H_2CO_3 | <u>carbonic</u> |

Write the formulas of the following acids.

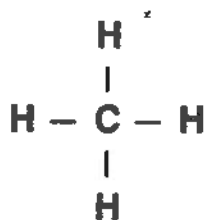
- | | |
|------------------------|---|
| 11. sulfuric acid | <u>H_2SO_4</u> |
| 12. nitric acid | <u>HNO_3</u> |
| 13. hydrochloric acid | <u>HCl</u> |
| 14. acetic acid | <u>$\text{HC}_2\text{H}_3\text{O}_2$</u> |
| 15. hydrofluoric acid | <u>HF</u> |
| 16. phosphorous acid | <u>H_3PO_3</u> |
| 17. carbonic acid | <u>H_2CO_3</u> |
| 18. nitrous acid | <u>HNO_2</u> |
| 19. phosphoric acid | <u>H_3PO_4</u> |
| 20. hydrosulfuric acid | <u>H_2S</u> |

NAMING ORGANIC COMPOUNDS

Name _____

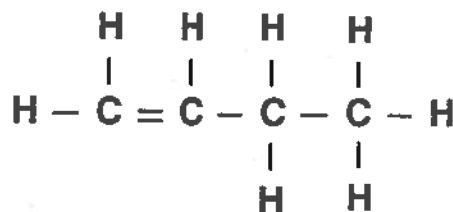
Name the following organic compounds.

1.



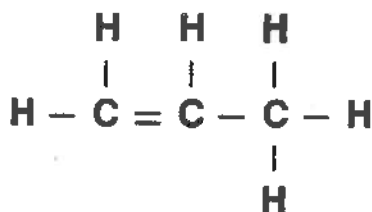
methane

5.



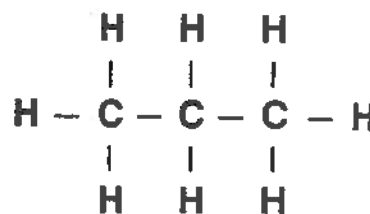
1-butene

2.



propene

6.



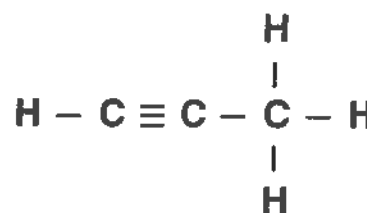
propane

3.



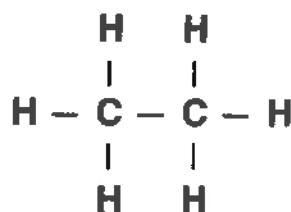
ethyne

7.



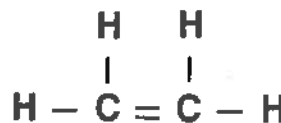
propyne

4.



ethane

8.



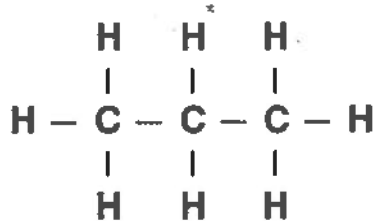
ethene

NAMING HYDROCARBONS

Name _____

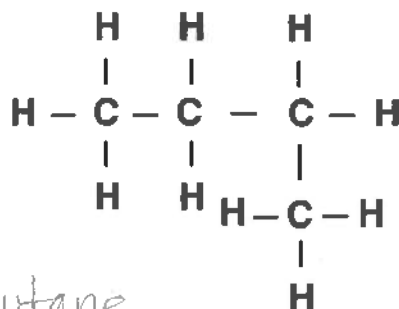
Name the compounds below according to the IUPAC naming system

1.



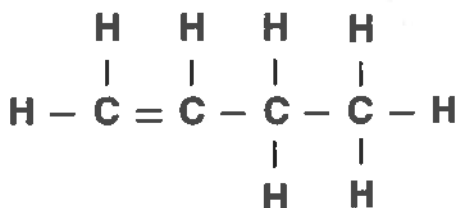
propane

5.



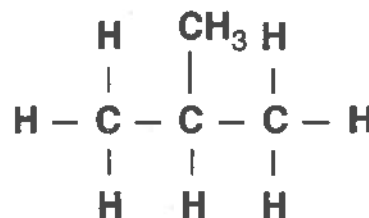
butane

2.



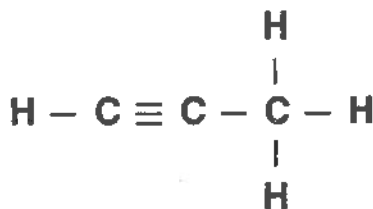
1-butene

6.



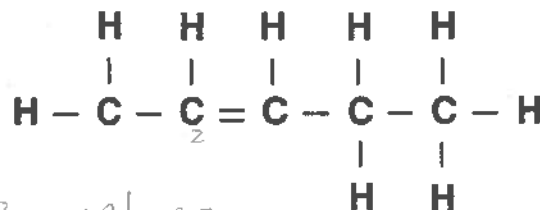
2-methylpropane

3.



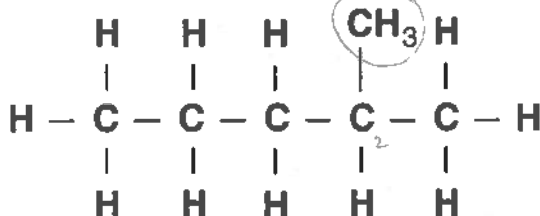
propyne

7.



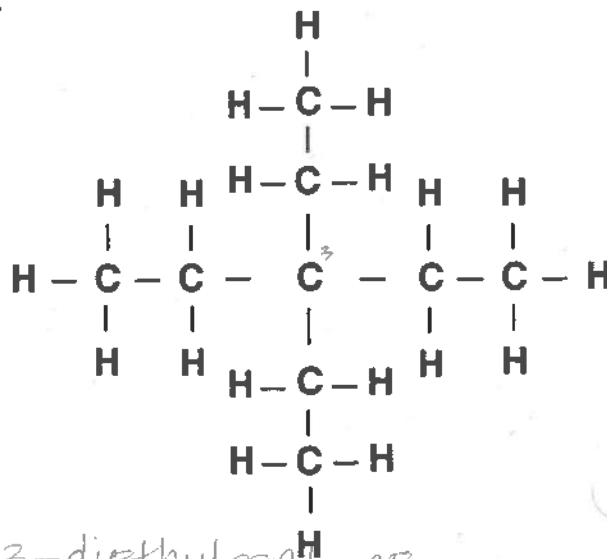
2-pentene

4.



2-methylpentane

8.



3,3-diethylpentane

DRAWING STRUCTURAL FORMULAS

Name _____

Draw the structural formula of the following compounds.

1. ethane



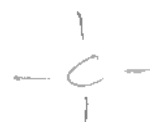
5. propyne



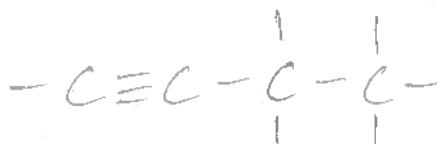
2. propene



6. methane



3. 1-butyne



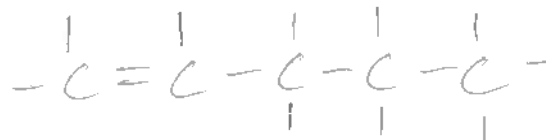
7. ethyne



4. ethene



8. 1-pentene



STRUCTURE OF HYDROCARBONS

Name _____

Draw the structure of the compounds below.

1. ethane



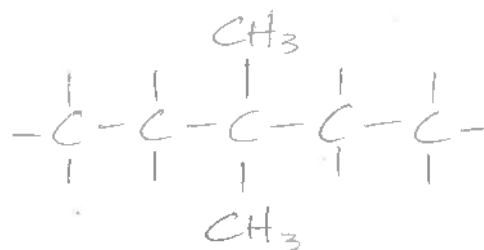
5. ethyne



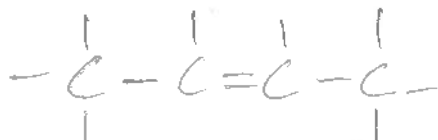
2. propene



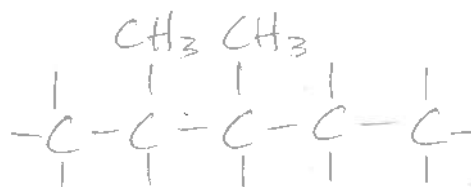
6. 3,3-dimethyl pentane



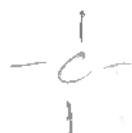
3. 2-butene



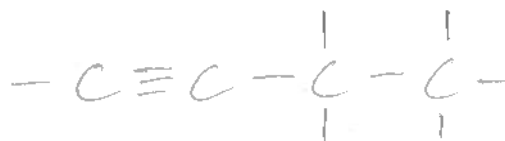
7. 2,3-dimethyl pentane



4. methane



8. n-butyne

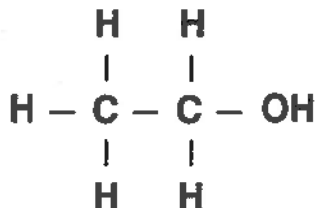


NAMING OTHER ORGANIC COMPOUNDS

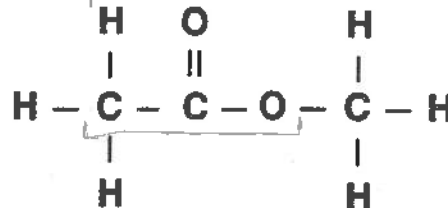
Name _____

Name the compounds below.

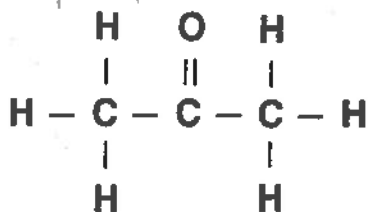
1. ethanol



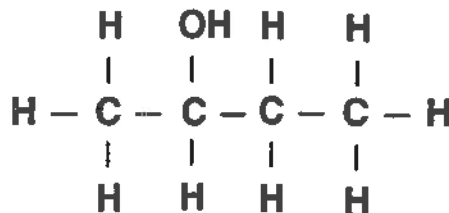
6. methyl ethanoate



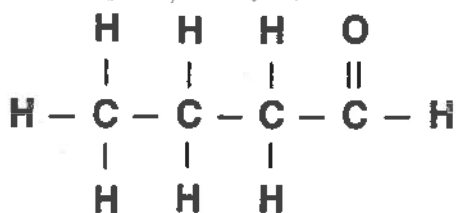
2. propanone



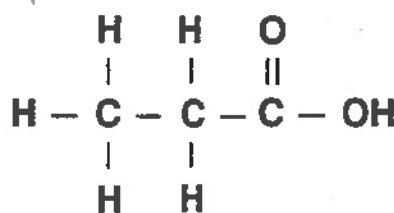
7. 2-butanol



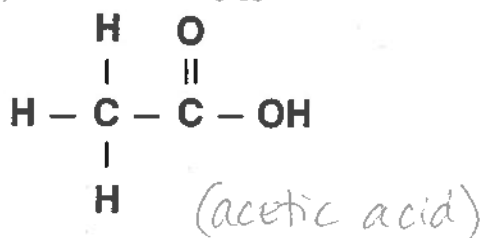
3. butanal



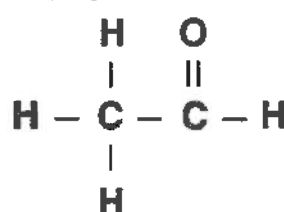
8. propanoic acid



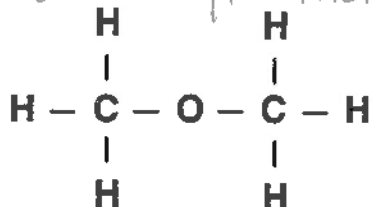
4. ethanoic acid



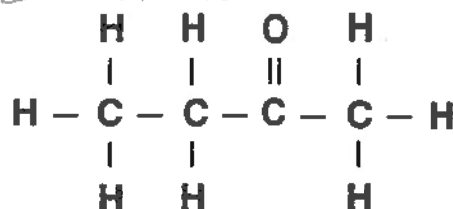
9. ethanal



5. dimethyl ether



10. 2-butanone



FUNCTIONAL GROUPS

Name _____

Classify each of the organic compounds below as an alcohol, carboxylic acid, aldehyde, ketone, ether or ester, and draw its structural formula.

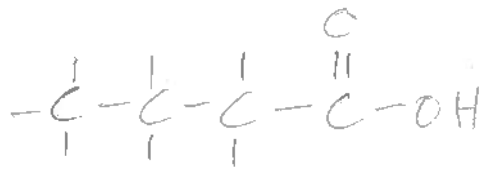
1. CH_3COOH (ethanoic acid) carboxylic acid $\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{C}-\text{OH} \\ \end{array}$	6. $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$ alcohol (2-propanol) $\begin{array}{c} \text{OH} \\ \\ -\text{C}-\text{C}-\text{C}- \\ \quad \quad \end{array}$
2. CH_3COCH_3 ketone (propanone) $\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{C}-\text{C}- \\ \quad \quad \end{array}$	7. $\text{CH}_3\text{CH}_2\text{COOH}$ (propanoic acid) $\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{C}-\text{C}-\text{OH} \\ \quad \quad \end{array}$ carboxylic acid
3. $\text{CH}_3\text{CH}_2\text{OH}$ alcohol (ethanol) $\begin{array}{c} -\text{C}-\text{C}-\text{OH} \\ \quad \end{array}$	8. $\text{CH}_3\text{CH}_2\text{COOCH}_3$ (methyl propanoate) $\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{C}-\text{C}-\text{O}-\text{C}- \\ \quad \quad \quad \end{array}$ ester
4. $\text{CH}_3\text{CH}_2\text{OCH}_3$ ether (ethyl methyl ether) $\begin{array}{c} -\text{C}-\text{C}-\text{O}-\text{C}- \\ \quad \quad \end{array}$	9. $\text{CH}_3\text{CH}_2\text{COCH}_3$ ketone (2-butanone) $\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{C}-\text{C}-\text{C}- \\ \quad \quad \quad \end{array}$
5. $\text{CH}_3\text{CH}_2\text{CHO}$ aldehyde (propanal) $\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \end{array}$	10. CH_3OCH_3 ether (dimethyl ether) $\begin{array}{c} -\text{C}-\text{O}-\text{C}- \\ \quad \end{array}$

STRUCTURES OF OTHER ORGANIC COMPOUNDS

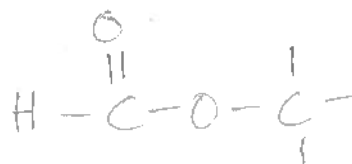
Name _____

Draw the structures of the compounds below.

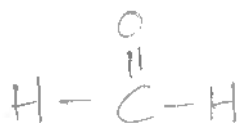
1. butanoic acid *



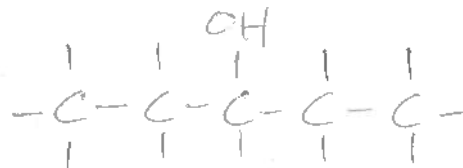
6. methylmethanoate (methyl formate)



2. methanal



7. 3-pentanol



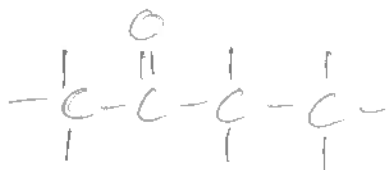
3. methanol



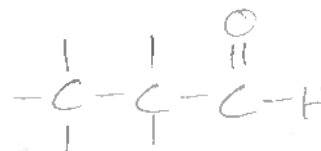
8. methanoic acid (formic acid)



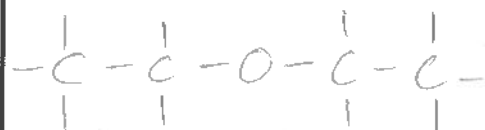
4. butanone



9. propanal



5. diethyl ether



10. 2-pentanone

