Binary Molecular Nomenclature

Rules for Binary Molecular Compounds	Prefixes
1. The naming system is for compounds composed of two <u>nonmetallic</u> elements. 2. The first element keeps its name a. The first element gets a prefix if it has a subscript in the formula 3. The second element gets the *–ide* suffix (ending) a. The second element ALWAYS gets a prefix	1 – mono 2 – di 3 – tri 4 – tetra 5 – penta 6 – hexa

Compound Name	***Compound Formula***
Carbon dioxide	CO_2
Carbon monoxide	CO
Diphosphorus pentoxide	P_2O_5
Dinitrogen monoxide	N_2O
Silicon dioxide	SiO_2
Carbon tetrabromide	CCl_4
Sulfur dioxide	SO_2
Phosphorus pentabromide	PBr_5
Iodine trichloride	ICl_3
Nitrogen triiodide	NI_3
Dinitrogen trioxide	N_2O_3

Compound Formula	***Compound Name***
N_2O_4	dinitrogen tetraoxide
SO_3	sulfur trioxide
NO	nitrogen oxide
NO_2	nitrogen dioxide
As_2O_5	diarsenic pentaoxide
PCl_3	phosphorus trichloride
CCl_4	carbon tetrachloride
H_2O	water
SeF_6	selenium hexafluoride

For answers to this worksheet, Click Here

Type I Binary Compounds contain Group I, II, and III metals with non-metal ions. Show the correct name for the following compounds.

Give correct names for these Type I binary compounds

KCl	potassium chloride	MgO	magnesium oxide
K_2O	potassium oxide	$AlCl_3$	aluminum chloride
CaO	calcium oxide	BaS	barium sulfide
$MgCl_2$	magnesium chloride	Al_2S_3	aluminum sufide
NaH	sodium hydride	SrF_2	strontium fluoride
ZnS	zinc sulfide	MgI_2	magnesium iodide
RbBr	rubidium bromide	CaSe	calcium selenide
Al_2O_3	aluminum oxide	$BaBr_2$	barium bromide
Na_3N	sodium nitride	CsCl	cesium chloride
Ca_2C	calcium carbide	Mg_3P_2	magnesium phosphide
KI	potassium iodide	$CaCl_2$	calcium chloride

Give correct formulas for these Type I binary compounds

calcium iodide	CaI_2	magnesium phosphide	Mg_3P_2
calcium hydride	CaH_2	sodium chloride	NaCl
magnesium fluoride	MgF_2	barium oxide	BaO
cadmium bromide	$CdBr_2$	aluminum arsenide	AlAs
sodium nitride	Na_3N	calcium sulfide	CaS
rubidium oxide	Rb_2O	potassium selenide	K_2Se
barium nitride	Ba_3N_2	sodium iodide	NaI
lithium chloride	LiCl	lithium sulfide	Li_2S
silver sulfide	Ag_2S	calcium carbide	Ca_2C
aluminum nitride	AlN	sodium hydride	NaH
cesium fluoride	CsF	magnesium nitride	Mg_3N_2

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Practice Problems (Answer using the Stock system.)

Write the correct name for:

1) CuS copper (II) sulfide
2) $PbBr_4$ lead (IV) bromide
3) Pb_3N_2 lead (II) nitride
4) Fe_2O_3 iron (III) oxide
5) FeI_2 iron (II) iodide
6) Sn_3P_4 tin (IV) phosphide
7) Cu_2S copper (I) sulfide
8) $SnCl_2$ tin (II) chloride
9) HgO mercury (II) oxide
10) Hg_2F_2 mercury (I) fluoride

21) Hg_2O mercury (I) oxide
22) Hg_2I_2 mercury (I) iodide
23) $AuCl_3$ gold (III) chloride
24) MnO manganese (II) oxide
25) $CrCl_3$ chromium (III) chloride
26) CoO cobalt (II) oxide
27) Mn_2O_3 manganese (III) oxide
28) Co_2S_3 cobalt (III) sulfide
29) AuF gold (I) fluoride
30) $CrBr_2$ chromium (II) bromide

Answers to Set One

11) $CuCl_2$ copper (II) chloride
12) $CuBr$ copper (I) bromide
13) PbO lead (II) oxide
14) Fe_2S_3 iron (III) sulfide
15) $PbCl_2$ lead (II) chloride
16) SnO tin (II) oxide
17) Cu_2O copper (I) oxide
18) PbO_2 lead (IV) oxide
19) FeO iron (II) oxide
20) SnO_2 tin (IV) oxide

Answers to Set Two

Answers to Set Three

Practice Problems (Answer using the Stock system.)

Write the correct formula for:

Fe^{2+} Cl^- Cl^-

1) iron(II) chloride $FeCl_2$

2) copper(I) sulfide Cu_2S

3) lead(IV) iodide PbI_4

4) tin(II) fluoride SnF_2

5) mercury(I) bromide Hg_2Br_2

6) tin(II) oxide SnO

7) chromium(III) oxide Cr_2O_3

8) gold(I) iodide AuI

9) manganese(II) nitride Mn_3N_2

10) cobalt(III) phosphide $CoPO_4$

Special words about mercury

Answers to Set One

11) iron(III) chloride $FeCl_3$

12) copper(II) sulfide CuS

13) lead(II) bromide $PbBr_2$

14) tin(IV) iodide SnI_4

15) mercury(II) fluoride HgF_2

16) tin(IV) oxide SnO_2

17) manganese(III) chloride Mn_2O_3

18) chromium(II) nitride Cr_3N_2

19) gold(III) oxide Au_2O_3

20) cobalt(II) phosphide Co_3P_2

Answers to Set Two

21) tin(II) sulfide SnS

22) mercury(I) sulfide Hg_2S

23) gold(III) bromide $AuBr_3$

24) manganese(II) oxide MnO

25) chromium(II) chloride $CrCl_2$

26) lead(IV) nitride Pb_3N_4

27) cobalt(III) oxide Co_2O_3

28) copper(II) iodide CuI_2

29) tin(IV) fluoride SnF_4

30) iron(II) phosphide Fe_3P_2

Answers to Set Three

Inorganic Nomenclature Worksheet

1. ammonium sulfide
2. sodium nitrate
3. cupric bromide
4. aluminum sulfate
5. potassium nitrate
6. ferrous carbonate
7. lead(II) phosphate
8. diphosphorus pentoxide
9. cupric hydroxide
10. calcium fluoride
11. nickel nitrate
12. silver cyanide
13. ammonium sulfite
14. zinc sulfate
15. tin(II) chloride
16. antimony(III) chloride
17. silver sulfide
18. magnesium hydroxide
19. ammonium carbonate
20. nickel acetate
21. sodium chromate
22. chromic bisulfate
23. potassium permanganate
24. silver perchlorate
25. potassium phosphate
26. nickel iodide
27. mercurous oxide
28. lead(II) chlorite
29. hydrogen iodide
30. iron(II) bisulfite
31. magnesium nitrate
32. iron(III) chromate
33. iron(II) chromate
34. copper(II) hydroxide
35. cuprous carbonate
36. chromic acetate
37. calcium chlorate
38. ammonium oxide
39. aluminum perchlorate
40. zinc bicarbonate
41. sodium phosphate
42. silver hypochlorite
43. ammonium phosphate
44. ferrous chlorite
45. potassium sulfide
46. tin(IV) bromide
47. lithium chromate
48. magnesium bisulfate
49. ferrous phosphate
50. calcium sulfate dihydrate
51. aluminum acetate
52. calcium chloride dihydrate
53. barium chromate
54. cobaltic chloride
55. barium chloride dihydrate
56. sulfurous acid
57. potassium hydroxide
58. zinc bisulfite
59. sodium sulfite
60. cobaltous sulfate
61. ferric oxide
62. silver phosphate
63. sodium hypochlorite
64. ammonium chromate
65. barium carbonate
66. calcium iodide
67. cupric sulfate
68. cuprous chloride
69. ferric carbonate
70. zinc phosphate
71. sodium nitrite
72. silver oxide
73. nickel bromide
74. magnesium oxide
75. mercuric perchlorate
76. lithium hypochlorite
77. oxygen difluoride
78. cobalt(II) hydrogen sulfate
79. acetic acid (see #128)
80. barium hypochlorite
81. ammonium hydroxide
82. cobalt(II) iodide
83. chromium(II) bicarbonate
84. sodium hydroxide
85. silver nitrate
86. mercury(II) nitrate
87. hydrochloric acid
88. aluminum bisulfite
89. cobalt(III) hydrogen sulfate
90. ferric hydrogen carbonate
91. phosphorus pentabromide
92. nickel chloride hexahydrate
93. ammonium aluminum sulfate
94. iron(III) hydrogen carbonate
95. mercury(I) hydrogen phosphate
96. plumbic hydrogen carbonate
97. mercuric hydrogen carbonate
98. mercurous hydrogen phosphate
99. copper(II) sulfate pentahydrate
100. chromic dihydrogen phosphate
101. sodium acetate
102. zinc sulfite
103. silver bicarbonate
104. potassium iodide
105. lead(IV) chlorite
106. mercurous chromate
107. lead(II) nitrite
108. potassium dichromate
109. magnesium carbonate
110. calcium bicarbonate
111. aluminum hydroxide
112. cobaltous oxide
113. ferric permanganate
114. ammonium chromate
115. nitrogen triiodide
116. sulfur trioxide
117. ammonium dichromate
118. iron(III) bicarbonate
119. ammonium perchlorate
120. cobaltic acetate
121. cobaltous hydroxide
122. iron(II) chromate
123. ferric bromide
124. zinc sulfate
125. boron phosphide
126. ferric bicarbonate
127. cupric bisulfate
128. acetic acid (diff. from 79)
129. barium bisulfite
130. nitric acid
131. calcium sulfide
132. copper(I) bisulfate
133. zinc permanganate
134. ferric carbonate
135. hydrobromic acid
136. hydrocyanic acid
137. hydrogen cyanide
138. sulfuric acid
139. copper(I) sulfate
140. chromium(III) oxide
141. aluminum oxide
142. cobaltous bisulfate
143. barium carbonate
144. mercuric chloride
145. ferrous chromate
146. cupric hydroxide
147. perchloric acid
148. ferric phosphate
149. lead(II) oxide
150. cobaltic chlorate

1. $(NH_4)_2S$
2. $NaNO_3$
3. $CuBr_2$
4. $Al_2(SO_4)_3$
5. KNO_3
6. $FeCO_3$
7. $Pb_3(PO_4)_2$
8. P_2O_5
9. $Cu(OH)_2$
10. CaF_2
11. $Ni(NO_3)_2$
12. $AgCN$
13. $(NH_4)_2SO_3$
14. $ZnSO_4$
15. $SnCl_2$
16. $SbCl_3$
17. Ag_2S
18. $Mg(OH)_2$
19. $(NH_4)_2CO_3$
20. $Ni(C_2H_3O_2)_2$
21. $NaCrO_3$
22. $Cr(HSO_4)_3$
23. $KMnO_4$

24. $AgClO_4$
25. K_3PO_4
26. NiI_2
27. Hg_2O
28. $Pb(ClO_2)_2$
29. HI
30. $Fe(HSO_3)_2$
31. $Mg(NO_3)_2$
32. $Fe(CrO_3)_3$
33. $Fe(CrO_3)_2$
34. $Cu(OH)_2$
35. Cu_2CO_3
36. $Cr(C_2H_3O_2)_3$
37. $Ca(ClO_3)_2$
38. $(NH_4)_2O$
39. $Al(ClO_4)_3$
40. $Zn(HCO_3)_2$
41. Na_3PO_4
42. $AgClO$
43. $(NH_4)_3PO_4$
44. $Fe(ClO)_2$
45. K_2S
46. $SnBr_4$
47. $LiCrO_3$
48. $Mg(HSO_4)_2$
49. $Fe_3(PO_4)_2$
50. $CaSO_4 \cdot 2H_2O$
51. $Al(C_2H_3O_2)_3$
52. $CaCl_2 \cdot 2H_2O$
53. $Ba(CrO_3)_2$
54. $CoCl_3$
55. $BaCl_2 \cdot 2H_2O$
56. H_2SO_3
57. KOH
58. $Zn(HSO_3)_2$
59. Na_2SO_3
60. $CoSO_4$
61. Fe_2O_3
62. Ag_3PO_4
63. $NaClO$
64. $(NH_4)_2CrO_4$
65. $BaCO_3$
66. CaI_2
67. $CuSO_4$
68. $CuCl$
69. $Fe_2(CO_3)_3$
70. $Zn_3(PO_4)_2$
71. $NaNO_2$
72. Ag_2O
73. $NiBr_2$

If a formula can be named more than one correct way, then give all. For example, $Fe(HCO_3)_3$ can be named four different ways. They are iron(III) bicarbonate, iron(III) hydrogen carbonate, ferric bicarbonate, and ferric hydrogen carbonate. The second way would be best.

151. HgF_2
152. KCl
153. $KMnO_4$
154. $KClO_4$
155. ZnO
156. $Ba(OH)_2$
157. NH_4MnO_4
158. $CaCO_3$
159. $Ba_3(PO_4)_2$
160. Fe_2O_3
161. CoF_3
162. H_2CO_3
163. K_2SO_4
164. $NaHSO_4$
165. PF_5
166. Ag_2O
167. $Pb(ClO_2)_2$
168. Cu_2CrO_4
169. $Ca(ClO_4)_2$
170. $HC_2H_3O_2$
171. LiI
172. $Al_2(SO_4)_3$
173. HBr
174. $Hg_2(ClO)_2$
175. $CrCl_3$
176. H_3PO_4
177. $LiMnO_4$
178. $Fe_2(HPO_4)_3$
179. Na_2CO_3
180. $Mg(HCO_3)_2$
181. $Sn_3(PO_4)_4$
182. HNO_3
183. $ZnCl_2$
184. NaH_2PO_4
185. Hg_2Cl_2
186. $Fe(NO_2)_2$
187. $CuNH_4PO_4$
188. $NaMgPO_4$
189. $Sn(HCO_3)_4$
190. $NaMnO_4$
191. KF
192. $CaSO_4$
193. HCl
194. $SbCl_3$
195. As_4O_{10}
196. NH_4Cl
197. NH_4NO_3
198. IF_5
199. $NaHCO_3$
200. $Ba(OH)_2$
201. $FeCl_3$
202. HF
203. $PbSO_4$
204. KrF_2
205. $NaCl$
206. P_2O_5
207. $AlBr_3$
208. $Ba(NO3)2$
209. BrF_5
210. P_4O_6
211. $FePO_4$
212. Hg_2SO_4
213. KH
214. $Co_2(SO_3)_3$
215. N_2O_3
216. N_2O
217. $Fe(NO_2)_3$
218. $Sn_3(PO_4)_2$
219. H_2O_2
220. $Be(OH)_2$
221. $Sr(HCO_3)_2$
222. $Sr(OH)_2$
223. P_4S_{10}
224. Hg_2O_2
225. $Hg_2(OH)_2$
226. NH_4F
227. XeF_6
228. $K_2Cr_2O_7$
229. NH_4OH
230. $(NH_4)_3PO_4$
231. N_2O_5
232. $SnCrO_4$
233. Al_2O_3
234. $CuCO_3$
235. ClO_2
236. CuS
237. MgI_2
238. $CoCl_3$
239. $NaCN$
240. Hg_3N_2
241. BrO_3
242. SiF_4
243. Sb_2O_5
244. LiH
245. SF_6
246. SnI_4
247. KOH
248. K_2O
249. H_2SO_4
250. lithium oxide
251. xenon trioxide
252. gold(I) chloride
253. gold(I) cyanide
254. sodium oxide
255. potassium chlorate
256. mercurous nitrite
257. nickel(II) fluoride
258. potassium cyanide
259. manganese dioxide
260. osmium tetrachloride
261. rubidium carbonate
262. trisulfur dinitride
263. nitrogen trichloride
264. vanadium(V) oxide
265. selenium tetrafluoride
266. stannous hypochlorite
267. tellurium hexafluoride
268. lanthanum(III) phosphate
269. sodium hydrogen sulfate monohydrate
270. chromium(III) hydrogen phosphate
271. $NaOH$
272. NI_3
273. ClF_3
274. P_3N_5
275. UF_6
276. NBr_3
277. Cl_2O_3
278. CsF
279. CO
280. Cu_2S
281. $KHCO_3$
282. $SbCl_5$
283. $CO2$
284. HgO
285. PCl_3
286. PBr_5
287. IF_7
288. Cl_2O
289. CCl_4
290. XeF_4
291. $Hg(OH)_2$
292. CaH_2
293. As_4O_6
294. BN
295. CoS
296. N_2O_4
297. H_3BO_3
298. I_2O_5
299. PbO
300. $NaBr$
301. Li_2CrO_4
302. ICl
303. SO_3
304. Hg_2O
305. NaH
306. OsO_4
307. XeF_2
308. $Ca(C_2H_3O_2)_2$
309. $NaC_2H_3O_2$
310. $Al(OH)_3$
311. Li_2HPO_4
312. $Ca(NO_3)_2$
313. $Ni(ClO_4)_2$
314. $Mn(NO_3)_2$
315. $An(H_2PO_4)_3$
316. $Al(C_2H_3O_2)_3$
317. $KAl(SO_4)_2$
318. $Al(MnO_4)_3$
319. $(NH_4)_3PO_4$
320. $CoSO_4 \cdot 6\,H_2O$
321. $MgCl_2 \cdot 6\,H_2O$
322. $CuSO_4 \cdot 5\,H_2O$
323. $NaHS \cdot H_2O$
324. $MgSO_4 \cdot 9\,H_2O$
325. $NaH_2PO_4 \cdot 9\,H_2O$
326. $Na_2CrO_4 \cdot 4\,H_2O$
327. $Pb(CH_3COO)_2 \cdot 3\,H_2O$
328. $Be(ClO_4)_2$
329. $(NH_4)_2Cr_2O_7$
330. $Ba(BrO_3)_2$
331. $AuCl_3$
332. Al_2S_3
333. Na_2HPO_4
334. $Mg_3(PO_4)_2$
335. $CuSO_3$
336. $KAl(C_2O_4)_2$
337. $Cr_2(SO_3)_3$
338. $HClO$
339. $HClO_2$
340. $HClO_3$
341. $HClO_4$
342. $Mn(IO_3)_2$
343. $KBrO_3$
344. $Fe(ClO_4)_3$
345. $Cr(OH)_3$

151. mercury (II) fluoride
152. potassium chloride
153. potassium permanganate
154. potassium perchlorate
155. zinc oxide
156. ~~calcium carbonate~~
159. ~~barium phosphate~~
158. ~~iron(III) oxide~~
159. barium phosphate
160. iron (III) oxide

161. cobalt (III) fluoride
162. carbonic acid
163. potassium sulfate
164. sodium bisulfate
165. phosphorus pentafluoride
166. silver oxide
167. lead (II) chlorite
168. copper (I) perchlorate
169. calcium perchlorate
170. acetic acid
171. lithium iodide
172. aluminum sulfate
173. hydrogen bromide (hydrobromic acid)
174. mercury (I) hypochlorite
175. chromium (III) chloride
176. phosphoric acid
177. lithium permanganate
178. iron (III) hydrogenphosphate
179. sodium carbonate
180. magnesium hydrogen carbonate
181. tin (IV) phosphate
182. nitric acid
183. zinc chloride
184. sodium dihydrogen phosphate
185. mercury (I) chloride
186. iron (II) nitrate
187. copper (II) ammonium phosphate
188. sodium magnesium phosphate
189. tin (IV) hydrogen carbonate
190. sodium permanganate
191. potassium fluoride
192. calcium sulfate
193. hydrogen chloride (hydrochloric acid)
194. antimony chloride
195. ~~or~~ tetra arsenic decaoxide
196. ammonium chloride
197. ammonium nitrate
198. iodine pentafluoride
199. sodium hydrogen carbonate
200. barium hydroxide
201. iron (III) chloride
202. hydrofluoric acid
203. lead (II) sulfate
204. krypton difluoride
205. sodium chloride
206. diphosphorus pentaoxide
207. aluminum bromide
208. barium nitrate
209. bromine pentafluoride
210. tetraphosphorus hexaoxide

Acid Nomenclature Worksheet Name KEY

Write the formula for each of the acids listed below:

1. Nitric acid	HNO_3
2. Chloric acid	$HClO_3$
3. Acetic acid	$HC_2H_3O_2$
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. $HClO_4$	perchloric acid
17. H_3PO_4	phosphoric acid
18. $HCl_{(aq)}$	hydrochloric acid
19. H_2SO_4	sulfuric acid
20. HNO_2	nitrous acid
21. $HI_{(aq)}$	hydroiodic acid
22. $HC_2H_3O_2$	acetic acid
23. $HF_{(aq)}$	hydrofluoric acid
24. H_3PO_3	phosphorous acid
25. $HClO_3$	chloric acid
26. H_2CO_3	carbonic acid
27. H_2SO_3	sulfurous acid
28. $HClO_2$	chlorous acid
29. HNO_3	nitric acid
30. $HBr_{(aq)}$	hydrobromic acid