Exercise 14.1a
Acids & Bases

Name: _____

Date: _____ Per: _____

DIRECTIONS: Answer the following in the space provided.

1. Complete the following table:

	Acids	Bases
Arhennius Definition:	donate H^+ in aqueous solution	donate OH^- in aqueous solution
Electrolyte?	yes	yes
Taste:	sour	bitter
Turns litmus:	red	blue
Texture on hands:	does	slippery (soapy)
Reactive w/metals to form H_2 gas?	with most metals, not all	nope

2. A(n) ___binary___ acid has only two elements, though they may exist in multiple ratios. Their names will always include the prefix ___hydro-___ and the suffix ___ic___ . Acids that have oxygen in their structure are called ___oxyacids (or oxoacids)___ and will have no prefixes. They will, however, have either the suffix ___ic___ or, ___ous___ . The suffix has to do with the number of ___number of oxygen atoms in the anion___ .

3. Complete the table (*some boxes will be blank*):

Naming Acids					
Acid	Anion Suffix	Acid Prefix	Acid Root	Acid Suffix	Acid Name
HCl	-ide	hydro	chlor	ic	hydrochloric acid
HClO	-ite	NA	chlor	ous	hypochlorous acid
$HClO_2$	-ite	NA	chlor	ous	chlorous acid
$HClO_3$	-ate	NA	chlor	ic	chloric acid
$HClO_4$	-ate	NA	chlor	ic	perchloric acid

4. Using your common ion chart as a reference, name/write the formula for the following *aqueous* substances.

a. H_2SO_4 ___sulfuric acid___

b. nitrous acid ___HNO_2___

c. H_2S ___hydrosulfuric acid___

d. hydroselenic acid ___H_2Se___

e. H_2CO_3 ___carbonic acid___

f. permanganic acid ___$HMnO_4$___

g. HNO_3 ___nitric acid___

h. acetic acid ___$HC_2H_3O_2$ (or CH_3COOH)___

i. H_3PO_3 ___phosphorous acid___

j. oxalic acid ___$H_2C_2O_4$___

k. $H_2Cr_2O_7$ ___dichromic acid___

l. hydroiodic acid ___HI___

5. Arrhenius acids produce ___hydrogen (H^+)___ ions in water, whereas Arrhenius bases produce ___hydroxide (OH^-)___ ions in water. The H^+ ion produced by an acid in solution bonds to water forming a(n) ___hydronium___ ion represented by the formula ___(H_3O^+)___ .

6. Classify each of the following as an Arrhenius acid or base from its formula:

a. $Ba(OH)_2$ ___Arrhenius base___

b. KNO_2 ___neither, but is an B-L base___

c. KOH ___Arrhenius base___

d. $Mg(OH)_2$ ___Arrhenius base___

e. HBr ___Arrhenius acid___

f. HCN ___Arrhenius acid___

g. LiOH ___Arrhenius base___

h. NH_3 ___neither, but is an B-L base___

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Strong acids and bases completely ionize in water. This means that essentially 100% of the acid or base forms products (the arrow in the chemical equation points one direction only). Weak acids and bases, however, only ionize partially before reaching a dynamic equilibrium (double arrows should be used in their formation equations).

	Acids	Bases
Weak	$HA(aq) + H_2O(l) \rightleftarrows H_3O^+(aq) + A^-(aq)$	$B(aq) + H_2O(l) \rightleftarrows HB^+(aq) + OH^-(aq)$
Strong	$HA(aq) + H_2O(l) \rightarrow H_3O^+(aq) + A^-(aq)$	$BOH(s) \xrightarrow{H_2O} B^+(aq) + OH^-(aq)$

DIRECTIONS: Answer the following in the space provided.

7. Write the equations (acid ionization equations) representing the ionization of each of these acids in aqueous solution.
   a. HCNO (weak acid)

      $HCNO(aq) + H_2O(l) \rightleftarrows H_3O^+(aq) + CNO^-(aq)$

   b. HCl (strong acid)

      $HCl(aq) + H_2O(l) \rightarrow H_3O^+(aq) + Cl^-(aq)$

   c. HNO_3 (strong acid)

      $HNO_3(aq) + H_2O(l) \rightarrow H_3O^+(aq) + NO_3^-(aq)$

   d. $HC_2H_3O_2$ (weak acid)

      $HC_2H_3O_2(aq) + H_2O(l) \rightleftarrows H_3O^+(aq) + C_2H_3O_2^-(aq)$

8. Write the equations (base dissociation equations) representing the dissociation of each of these bases in aqueous solution.
   a. NaOH (strong base)

      $B(aq) \xrightarrow{H_2O} HB^+(aq) + OH^-(aq)$

   b. NH_3 (weak base)

      $B(aq) + H_2O(l) \rightleftarrows HB^+(aq) + OH^-(aq)$

   c. CH_3NH_2 (weak base)

      $B(aq) + H_2O(l) \rightleftarrows HB^+(aq) + OH^-(aq)$

   d. KOH (strong base)

      $B(aq) \xrightarrow{H_2O} HB^+(aq) + OH^-(aq)$