Strong, Weak, or Non-Electrolyte?

For the purposes of this course, use these criteria to determine if a substance is a strong, weak, or non-electrolyte when dissolved in water (aqueous solution):

- 1. All ionic compounds are strong electrolytes, because they mostly break up into ions as they dissolve in water. Even insoluble ionic compounds (e.g., AgCl, PbSO₄, CaCO₃) are strong electrolytes, because the small amounts that do dissolve in water do so principally as ions; i.e., there is virtually no undissociated form of the compound in solution.
- 2. Molecular compounds may be non-electrolytes, weak electrolytes, or strong electrolytes, depending on whether they dissolve without ion formation, a little ion formation, or mostly ion formation, respectively. Examples:

Molecular CompoundElectrolyte TypeSpecies in Solutionsucrose (table sugar)non-electrolytemolecules onlyacetic acid $(HC_2H_3O_2 = HOAc)$ weak electrolytemolecules and some ionshydrogen chloride (HCI)strong electrolyteions only

3. Strong acids and strong bases are strong electrolytes [e.g., HCI(aq), $H_2SO_4(aq)$, $HCIO_4(aq)$; NaOH(aq)]. There are virtually no molecules of a strong acid or base in solution, only ions.

Know the strong acids and bases on the accompanying hand-out "Strong and Weak Acids and Bases". Assume that any other acid or base you encounter in this course is weak, unless told to the contrary. [Note: Mg(OH)₂, an insoluble compound, is a strong base because it is an ionic compound and therefore a strong electrolyte.]