TABLE 6 Relative Strengths of Acids and Bases

Conjugate acid	Formula	Conjugate base	Formula
hydriodic acid*	HI	iodide ion	I^-
perchloric acid*	$HClO_4$	perchlorate ion	ClO_4^-
hydrobromic acid*	HBr	bromide ion	Br^-
hydrochloric acid*	HCl	chloride ion	Cl^-
sulfuric acid*	H_2SO_4	hydrogen sulfate ion	HSO_4^-
chloric acid*	$HClO_3$	chlorate ion	ClO_3^-
nitric acid*	HNO_3	nitrate ion	NO_3^-
hydronium ion	H_3O^+	water	H_2O
chlorous acid	$HClO_2$	chlorite ion	ClO_2^-
hydrogen sulfate ion	HSO_4^-	sulfate ion	SO_4^{2-}
phosphoric acid	H_3PO_4	dihydrogen phosphate ion	$H_2PO_4^-$
hydrofluoric acid	HF	fluoride ion	F^-
acetic acid	CH_3COOH	acetate ion	CH_3COO^-
carbonic acid	H_2CO_3	hydrogen carbonate ion	HCO_3^-
hydrosulfuric acid	H_2S	hydrosulfide ion	HS^-
dihydrogen phosphate ion	$H_2PO_4^-$	hydrogen phosphate ion	HPO_4^{2-}
hypochlorous acid	HClO	hypochlorite ion	ClO^-
ammonium ion	NH_4^+	ammonia	NH_3
hydrogen carbonate ion	HCO_3^-	carbonate ion	CO_3^{2-}
hydrogen phosphate ion	HPO_4^{2-}	phosphate ion	PO_4^{3-}
water	H_2O	hydroxide ion	OH^-
ammonia	NH_3	amide ion†	NH_2^-
hydrogen	H_2	hydride ion†	H^-

Increasing acid strength ↑

Increasing base strength ↓

* Strong acids
† Strong bases

conjugate acid, H_2. In aqueous solutions, all of the strong acids are 100% ionized, forming hydronium ions along with their anion. The acids below hydronium ion in **Table 6** do not ionize 100% in water. Acid strength alone does not predict reactivity. Although water is a weak acid, the hydride ion is a strong enough base to pull a proton from water. Such a reaction is illustrated in **Figure 11.**

Amphoteric Compounds

You have probably noticed that water can be either an acid or a base. *Any species that can react as either an acid or a base is described as* **amphoteric.** For example, consider the first ionization of sulfuric acid, in which water acts as a base.