Carboxylic Acid Derivatives, Summary of Similar Reactions

Brown & Poon 3rd ed., sections 15.4-15.6 + 15.9

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	+ water	**+ alcohol**	**+ 1°/2° amine or ammonia**	**1) + $LiAlH_4$...**
acid derivatives *(in general)*	→ **carboxylic acid**	→ **ester**	→ **amide**	→ (***structure with carbonyl =O removed***)
acid halide	→ **carboxylic acid** + HX	→ **ester** + HX	→ **amide** + N^+ cation + X^-	2) + H_2O → **1° alcohol**
acid anhydride	→ **2 carboxylic acids**	(w/ weak base – such as an amine – catalyst) → **ester + carboxylic acid**	(w/ weak base catalyst) → **amide + carboxylic acid**	
ester	(w/ base or acid catalyst) → **carboxylic acid**	(w/ H^+ catalyst) → **transesterified ester** (-OR swapped for -OR from alcohol)	→ **amide + alcohol**	2) + H^+ → **2 alcohols**
amide	(w/ base or acid catalyst and heat) → **carboxylic acid + amine**			2) + H_2O → **amine**
carboxylic acid		(w/ strong acid – such as H_2SO_4 – catalyst) → **ester** + H_2O		2) + H^+ → **alcohol**

NOTE that this table does NOT include ALL reactions of carboxylic acid derivatives, but it should help you to see that there are similar patterns of reactivity.