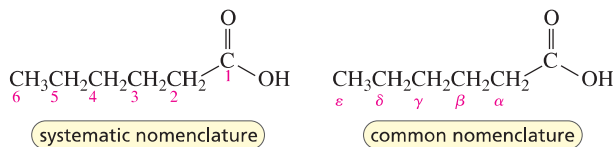
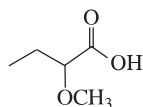


In systematic nomenclature, the position of a substituent is designated by a number. The carbonyl carbon is always the C-1 carbon. In common nomenclature, the position of a substituent is designated by a lowercase Greek letter, and the carbonyl carbon is not given a designation. Thus, the carbon adjacent to the carbonyl carbon is the α -carbon, the carbon adjacent to the α -carbon is the β -carbon, and so on.

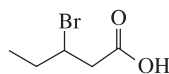


α = alpha
 β = beta
 γ = gamma
 δ = delta
 ϵ = epsilon

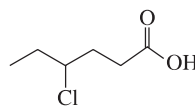
Take a careful look at the following examples to make sure that you understand the difference between systematic (IUPAC) and common nomenclature:



systematic name: 2-methoxybutanoic acid
common name: α -methoxybutyric acid

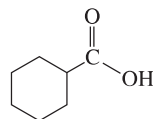


systematic name: 3-bromopentanoic acid
common name: β -bromovaleric acid

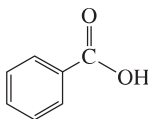


systematic name: 4-chlorohexanoic acid
common name: γ -chlorocaproic acid

Carboxylic acids in which a carboxyl group is attached to a ring are named by adding “carboxylic acid” to the name of the cyclic compound.



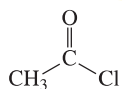
cyclohexanecarboxylic acid



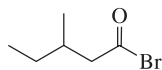
benzenecarboxylic acid
 benzoic acid

Naming Acyl Chlorides

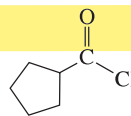
Acyl chlorides have a Cl in place of the OH group of a carboxylic acid. Acyl chlorides are named by replacing “ic acid” of the acid name with “yl chloride.” For cyclic acids that end with “carboxylic acid,” “carboxylic acid” is replaced with “carbonyl chloride.” (Acyl bromides exist too, but are less common than acyl chlorides.)



systematic name: ethanoyl chloride
common name: acetyl chloride



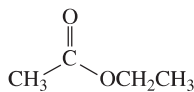
systematic name: 3-methylpentanoyl bromide
common name: β -methylvaleryl bromide



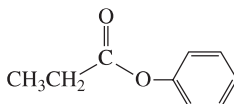
systematic name: cyclopentanecarbonyl chloride

Naming Esters

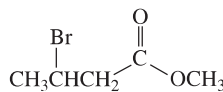
An **ester** has an OR' group in place of the OH group of a carboxylic acid. In naming an ester, the name of the group (R') attached to the **carboxyl oxygen** is stated first, followed by the name of the acid, with “ic acid” replaced by “ate.” (The prime on R' indicates that the alkyl group it designates does not have to be the same as the alkyl group designated by R.) Recall that a benzene ring is called a phenyl group and a benzene ring attached to a methylene group is called a benzyl group (see the top of the next page).



systematic name: ethyl ethanoate
common name: ethyl acetate



systematic name: phenyl propanoate
common name: phenyl propionate

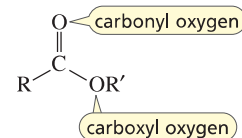


systematic name: methyl 3-bromobutanoate
common name: methyl β -bromobutyrate



α -Hydroxycarboxylic acids are found in skin products that claim to reduce wrinkles by penetrating the top layer of the skin, causing it to flake off.

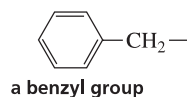
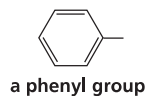
LEARN THE STRATEGY



The double-bonded oxygen is the carbonyl oxygen.

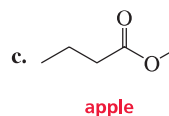
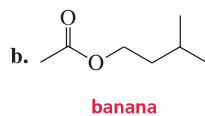
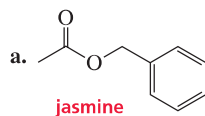
The single-bonded oxygen is the carboxyl oxygen.

USE THE STRATEGY

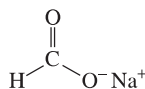


PROBLEM 1 ♦

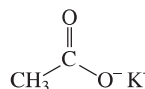
The aromas of many flowers and fruits are due to esters such as those shown in this problem. What are the common names of these esters? (Also see Problem 57.)



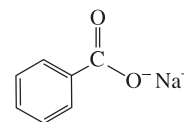
Salts of carboxylic acids are named similarly to the way esters are named. That is, the cation is named first, followed by the name of the acid, again with “ic acid” replaced by “ate.”



systematic name: sodium methanoate
common name: sodium formate

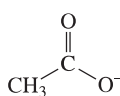


potassium ethanoate
potassium acetate

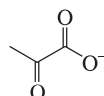


sodium benzenecarboxylate
sodium benzoate

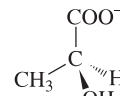
Frequently, the name of the cation is omitted.



acetate

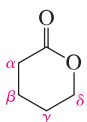


pyruvate

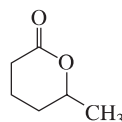


(S)-(+)-lactate

Cyclic esters are called **lactones**. In systematic nomenclature, they are named as “2-oxacycloalkanones” (“oxa” designates the oxygen atom; “one” designates the doubly bonded oxygen). For their common names, the length of the carbon chain is indicated by the common name of the carboxylic acid, and a Greek letter specifies the carbon to which the oxygen is attached. Thus, six-membered ring lactones are δ -lactones (the carboxyl oxygen is on the δ -carbon), five-membered ring lactones are γ -lactones, and four-membered ring lactones are β -lactones.



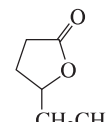
2-oxacyclohexanone
 δ -valerolactone
a δ -lactone



3-methyl-2-oxacyclohexanone
 δ -caprolactone
a δ -lactone



2-oxacyclopentanone
 γ -butyrolactone
a γ -lactone

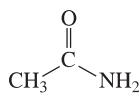


3-ethyl-2-oxacyclopentanone
 γ -caprolactone
a γ -lactone

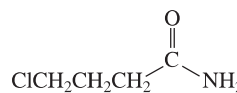
Naming Amides

LEARN THE STRATEGY

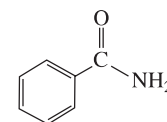
An **amide** has an NH_2 , NHR , or NR_2 group in place of the OH group of a carboxylic acid. Amides are named by replacing “oic acid,” “ic acid,” or “ylic acid” of the acid name with “amide.”



systematic name: ethanamide
common name: acetamide



4-chlorobutanamide
 γ -chlorobutyramide



benzenecarboxamide
benzamide

If a substituent is bonded to the nitrogen, the name of the substituent is stated first (if there is more than one substituent bonded to the nitrogen, they are stated alphabetically), followed by the name of the amide. The name of each substituent is preceded by an *N* to indicate that the substituent is bonded to a nitrogen.