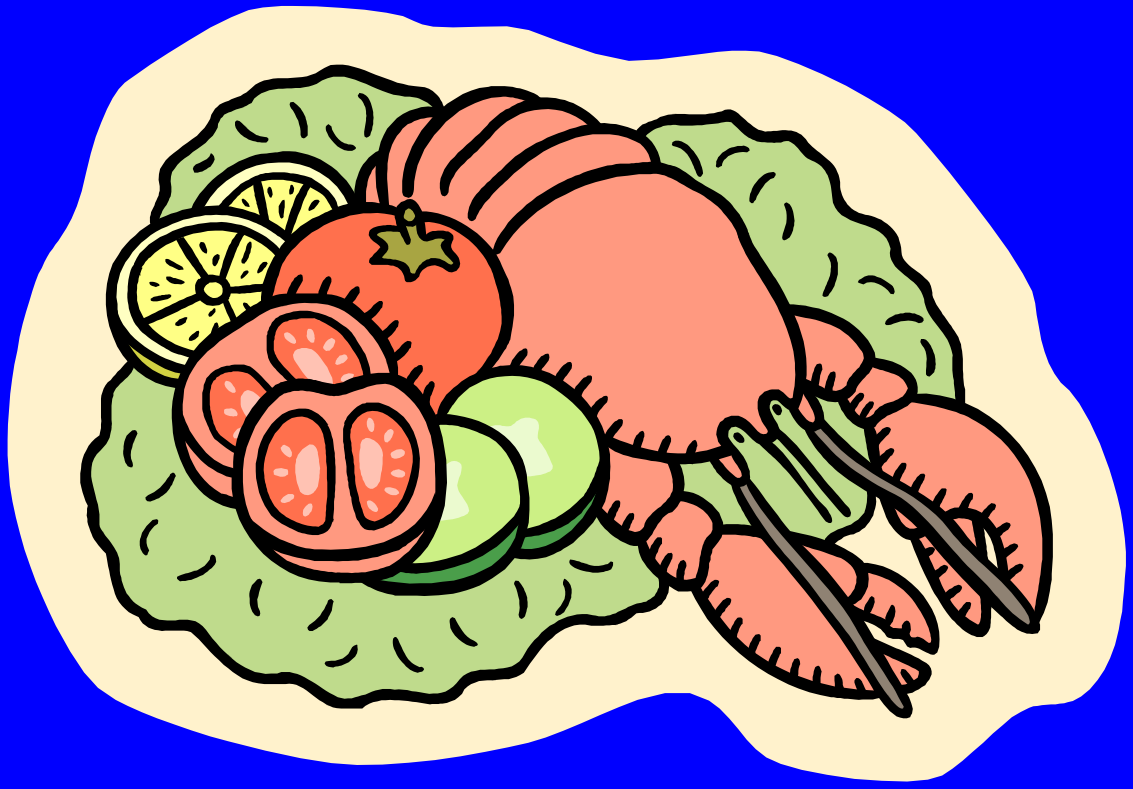
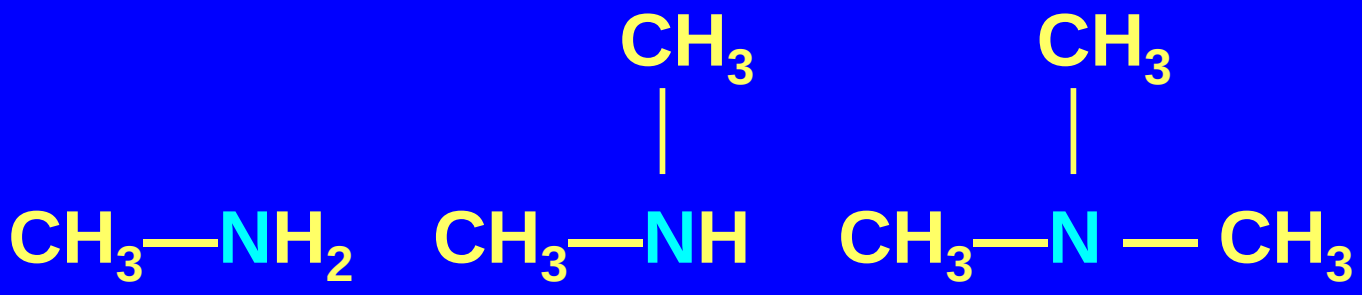
Amines and Amides



Amines

- Organic compounds of nitrogen N
- Classified as primary, secondary, tertiary



1° 2° 3°

IUPAC Naming of 1º Amines

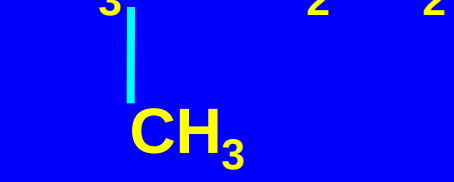
1. Select the longest carbon chain that contains the N as the parent
2. Name parent by removing the –e of the alkane and replacing it with the suffix *–amine*
3. # the parent from the end nearest the N
4. The location of the amino group comes before the parent
5. If the parent is substituted, the branch's name and # comes before the parent

Examples

$CH_3CH_2NH_2$

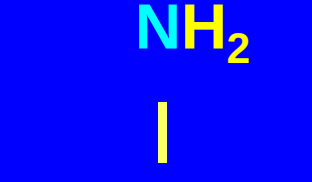
ethanamine

(ethylamine)



2-methyl-1-propanamine

(Isobutylamine)



2-propanamine

(isopropylamine)

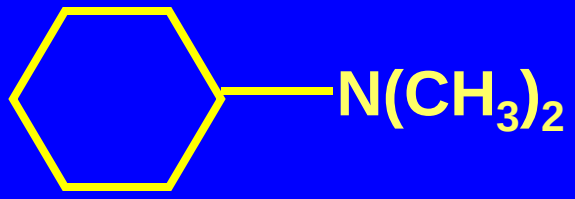
IUPAC Naming 2º and 3º Amines (more than one branch off of the N)

1. The largest alkyl chain is considered the parent
2. The other alkyl chains are placed in front of the parent using the prefix *N*- to denote that it is attached to the N

$CH_3NHCH_2CH_3$

N- methylethanamine

N,N-dimethylcyclohexanamine

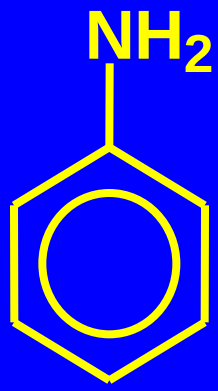


Examples

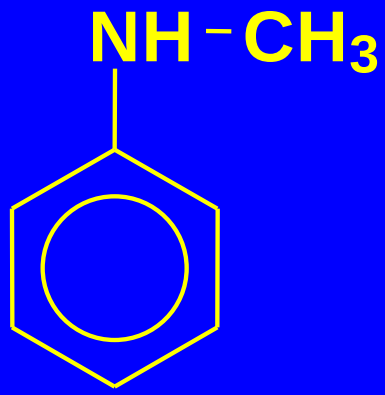
$CH_3—NH—CH_3$

N-methylmethanamine

(dimethylamine)



Aniline



N-methylaniline

Naming Amines

ethanamine

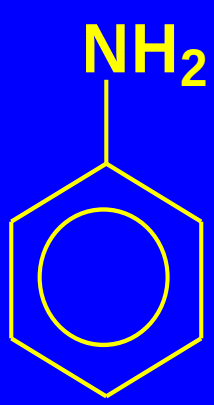
$CH_3CH_2NH_2$

N-methylmethanamine

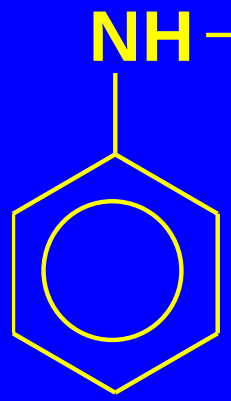
$CH_3—NH—CH_3$

$CH_3CH(NH_2)CH_3$

2-propanamine



phenylamine



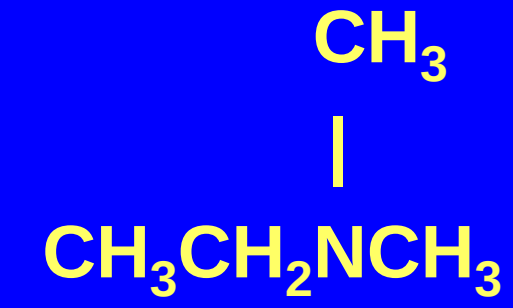
N-phenylmethanamine
or N-methylphenylamine

Learning Check

Name the following:

A. $CH_3NHCH_2CH_3$

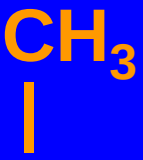
B.



Solution

A. $CH_3NHCH_2CH_3$

N-methylethylamine, 2°



B. $CH_3CH_2NCH_3$

N, N-dimethylethanamine, 3°

Leaning Check

Write a structural formula for

A. pentanamine

Solution

A. pentanamine

$CH_3CH_2CH_2CH_2CH_2\text{-}NH_2$

Learning Check

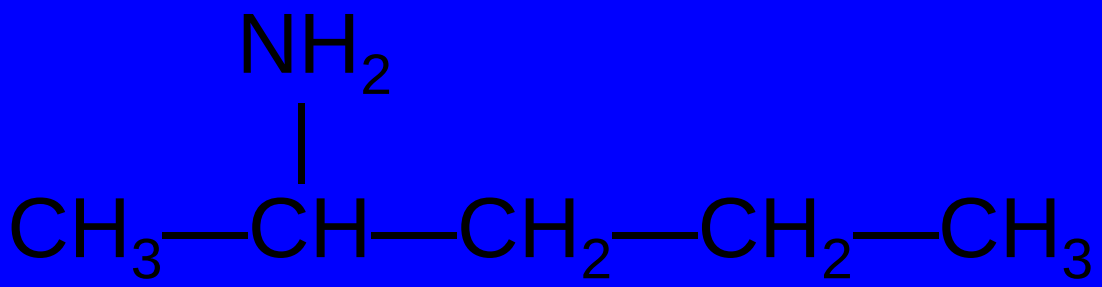
Write a structural formula for

A. 2-pentanamine

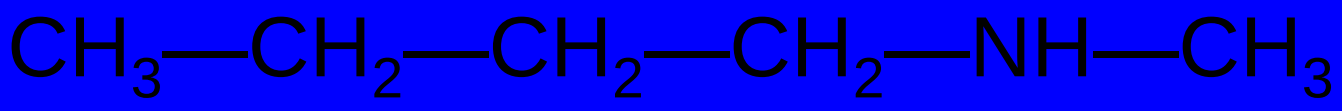
B. *N*-methyl-1-butanamine

Solution

A. 2-pentanamine



B. *N*-methyl-1-butanamine

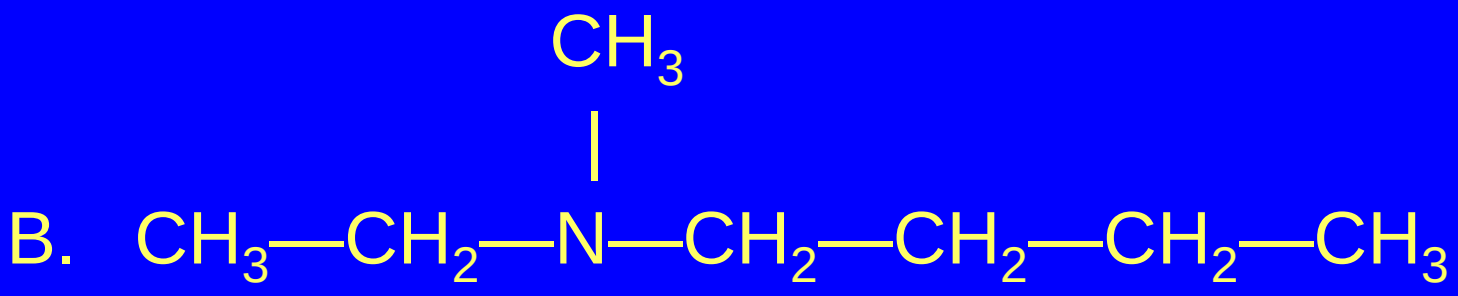


Learning Check

Give a name for each:

A. $CH_3—NH—CH_2—CH_3$

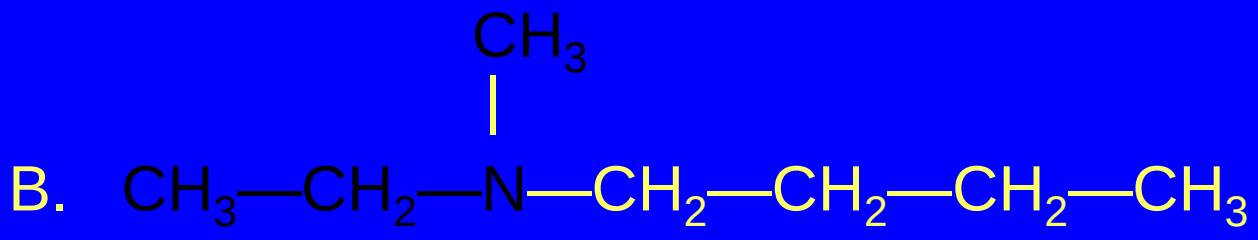
B.



Solution

A. $CH_3—NH—CH_2—CH_3$

N-methylethanamine

B. 

N-ethyl-*N*-methyl-1-butanamine

Amides

Derivatives of carboxylic acids where an amino (-NH_2) group replaces the –OH group.

ethanoic acid (acetic acid)

ethanamide (acetamide)

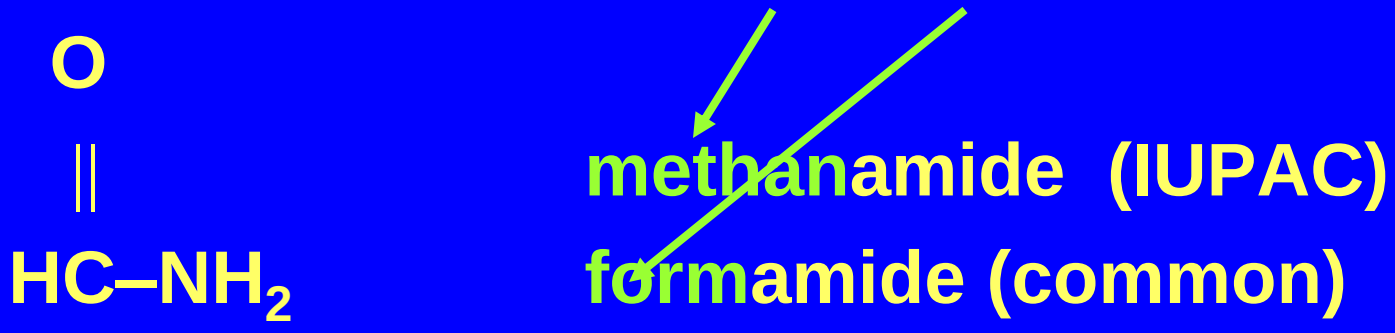
Amide Nomenclature

- Are named as derivatives of carboxylic acids so the name is based on the name of a parent acid

1. The ending of the acid is changed from *–oic acid* to *–amide*
2. Names of groups attached to N precede the parent with the *N-* prefix as the locator

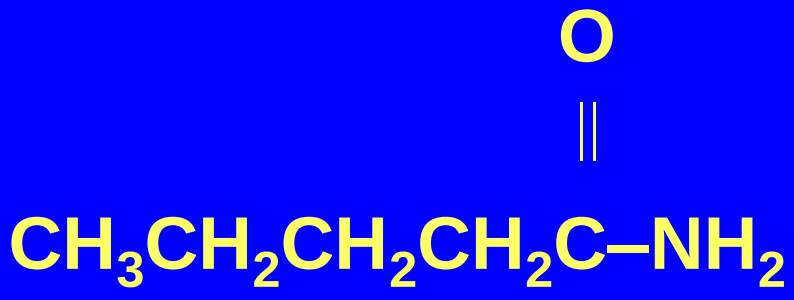
Naming Amides

Alkanamide **from acid name**

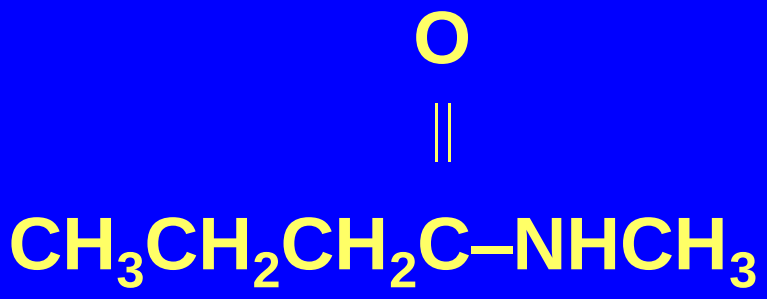


Examples

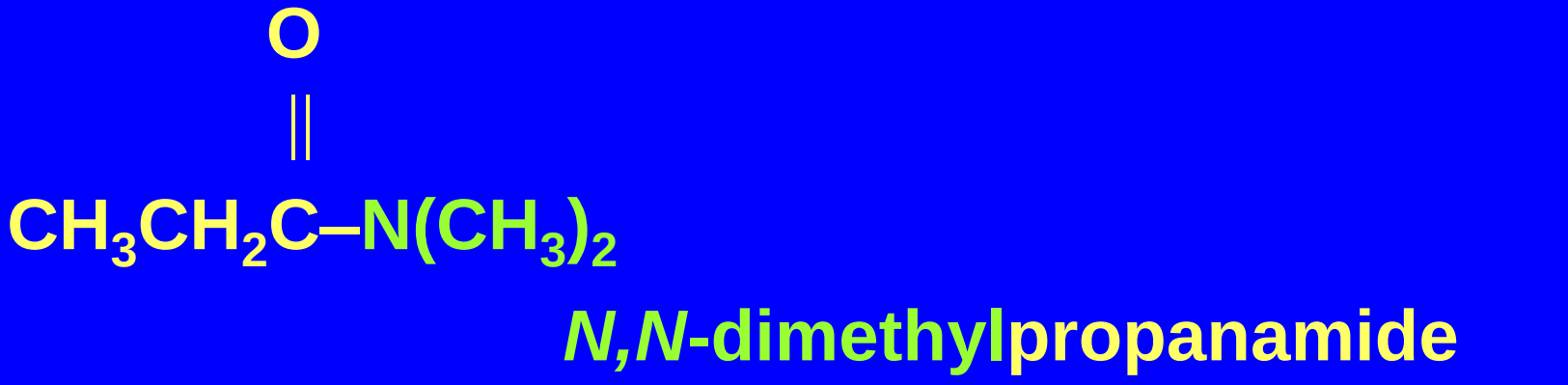
A. Pentanamide



B. *N*-methylbutanamide



Naming Amides with N-Groups



Learning Check

Name the following amides:

A. $CH_3CH_2CH_2\overset{\overset{O}{\|}}{C}–NH_2$

B. $CH_3\overset{\overset{O}{\|}}{C}–N(CH_2CH_3)_2$

Solution

A. $CH_3CH_2CH_2\overset{\overset{O}{\|}}{C}–NH_2$

butanamide

B. $CH_3\overset{\overset{O}{\|}}{C}–N(CH_2CH_3)_2$

N,N-diethylethanamide

Learning Check

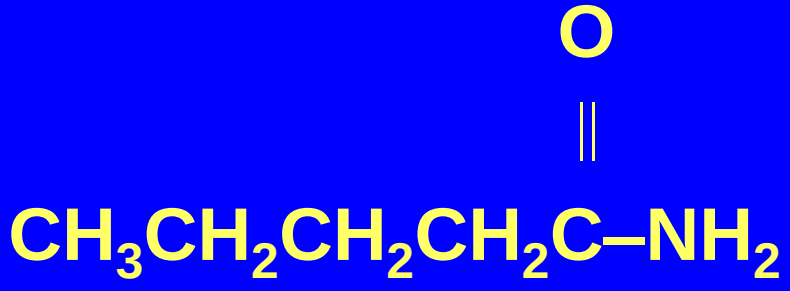
Draw the structures of

A. Pentanamide

B. ***N*****-methylbutanamide**

Solution

A. **Pentanamide**



B. ***N*-methylbutanamide**