

Amines and related compounds

Before you answer the gridlock below fill in the table of amines and related species using:

trimethylamine	NH_3	CH_3NH_2	quaternary ammonium ion
Type of compound	General formula	Example	Example name
ammonia		NH_3	ammonia
primary amine	RNH_2		methylamine
secondary amine	R_2NH	$\text{CH}_3\text{NHCH}_2\text{CH}_3$	N-methylethylamine
tertiary amine	R_3N	$(\text{CH}_3)_3\text{N}$	
	R_4N^+	$(\text{CH}_3)_4\text{N}^+$	tetramethylammonium ion

Gridlock 1

Each row, column and 2 x 2 box contains information about ammonia and the three types of amine. Use your problem solving skills and the answers in the table above to fill in the blank boxes.

type of compound		general formula	
primary amine			NH_3
			tertiary amine
R_2NH			
general formula		type of compound	

gridlocks – can you unlock the grid?

Gridlock 2

Each row, column and 2 x 2 box contains information about the three amines and quaternary ammonium ion.

type of compound		general formula	
primary amine			R_4N^+
	$CH_3NHCH_2CH_3$		trimethylamine
example		example name	

Gridlock 3

Each row, column and 2 x 2 box contains information about the three amines and quaternary ammonium ion.

type of compound		general formula	
primary amine			
		R_3N	
		tetramethylammonium ion	
	$CH_3NHCH_2CH_3$		
example		example name	

Amines and related compounds – answers

Type of compound	General formula	Example	Example name
ammonia	NH_3	NH_3	ammonia
primary amine	RNH_2	CH_3NH_2	methylamine
secondary amine	R_2NH	$\text{CH}_3\text{NHCH}_2\text{CH}_3$	N-methylethylamine
tertiary amine	R_3N	$(\text{CH}_3)_3\text{N}$	trimethylamine
quaternary ammonium ion	R_4N^+	$(\text{CH}_3)_4\text{N}^+$	tetramethylammonium ion

Gridlock 1 – answers

type of compound		general formula	
primary amine	secondary amine	R_3N	NH_3
tertiary amine	ammonia	RNH_2	R_2NH
NH_3	RNH_2	secondary amine	tertiary amine
R_2NH	R_3N	ammonia	primary amine
general formula		type of compound	

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Gridlock 2 – answers

type of compound		general formula	
primary amine	tertiary amine	R_2NH	R_4N^+
secondary amine	quaternary ammonium ion	R_3N	RNH_2
$(CH_3)_4N^+$	$CH_3NHCH_2CH_3$	methylamine	trimethylamine
$(CH_3)_3N$	CH_3NH_2	tetramethylammonium ion	N-methylethylamine
example		example name	

Gridlock 1 – answers

type of compound		general formula	
primary amine	tertiary amine	R_2NH	R_4N^+
secondary amine	quaternary ammonium ion	R_3N	RNH_2
$(CH_3)_3N$	CH_3NH_2	tetramethylammonium ion	N-methylethylamine
$(CH_3)_4N^+$	$CH_3NHCH_2CH_3$	methylamine	trimethylamine
example		example name	