

gridlocks – can you unlock the grid?

Alkanes

Before you answer the puzzles below fill in the table of alkanes:

Name	Number of carbons	Formula	Displayed formula
methane	1	CH ₄	
ethane	2		$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$
propane	3	C ₃ H ₈	
butane	4	C ₄ H ₁₀	
pentane	5		
hexane	6		

Gridlock 1

Each row, column and 2 x 2 box contains information about the first four alkanes listed above. Use your problem solving skills and the answers in the table above to fill in the blank boxes.

name		formula	
methane			C ₄ H ₁₀
	butane	CH ₄	
	C ₃ H ₈	ethane	
formula			name

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Gridlock 2

In puzzle 2 you need to first work out which of the four alkanes are in the puzzle and then solve it.

name		formula	
hexane			
		C_4H_{10}	
		$ \begin{array}{cccccc} H & H & H & H & H & \\ & & & & & \\ H-C & -C & -C & -C & -C & -H \\ & & & & & \\ H & H & H & H & H & \end{array} $	
	C_3H_8		
formula		displayed formula	

Gridlock 3

In puzzle 3 you need to first work out which of the four alkanes are in the puzzle and then solve it.

name		displayed formula	
	pentane		$ \begin{array}{ccc} H & & H \\ & & \\ H-C & - & C-H \\ & & \\ H & & H \end{array} $
			$ \begin{array}{cccccc} H & H & H & H & H & \\ & & & & & \\ H-C & -C & -C & -C & -C & -H \\ & & & & & \\ H & H & H & H & H & \end{array} $
$ \begin{array}{cccccc} H & H & H & H & H & H \\ & & & & & \\ H-C & -C & -C & -C & -C & -C-H \\ & & & & & \\ H & H & H & H & H & H \end{array} $			C_3H_8
displayed formula		formula	

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Alkanes – answers

Name	Number of carbons	Formula	Displayed formula
methane	1	CH ₄	<pre> H H - C - H H </pre>
ethane	2	C ₂ H ₆	<pre> H H H - C - C - H H H </pre>
propane	3	C ₃ H ₈	<pre> H H H H - C - C - C - H H H H </pre>
butane	4	C ₄ H ₁₀	<pre> H H H H H - C - C - C - C - H H H H H </pre>
pentane	5	C ₅ H ₁₂	<pre> H H H H H H - C - C - C - C - C - H H H H H H </pre>
hexane	6	C ₆ H ₁₄	<pre> H H H H H H H - C - C - C - C - C - C - H H H H H H H </pre>

Gridlock 1 – answers

name		formula	
methane	ethane	C ₃ H ₈	C ₄ H ₁₀
propane	butane	CH ₄	C ₂ H ₆
C ₂ H ₆	CH ₄	butane	propane
C ₄ H ₁₀	C ₃ H ₈	ethane	methane
formula		name	

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Gridlock 2 – answers

name		formula	
hexane	butane	C_3H_8	C_5H_{12}
propane	pentane	C_4H_{10}	C_6H_{14}
C_4H_{10}	C_6H_{14}	$ \begin{array}{ccccccc} & H & H & H & H & H & \\ & & & & & & \\ H & -C & -C & -C & -C & -C & -H \\ & & & & & & \\ & H & H & H & H & H & \end{array} $	$ \begin{array}{ccccccc} & H & H & H & & & \\ & & & & & & \\ H & -C & -C & -C & -H & & \\ & & & & & & \\ & H & H & H & & & \end{array} $
C_5H_{12}	C_3H_8	$ \begin{array}{ccccccc} & H & H & H & H & H & \\ & & & & & & \\ H & -C & -C & -C & -C & -C & -H \\ & & & & & & \\ & H & H & H & H & H & \end{array} $	$ \begin{array}{ccccccc} & H & H & H & H & & \\ & & & & & & \\ H & -C & -C & -C & -C & -H & \\ & & & & & & \\ & H & H & H & H & & \end{array} $
formula		displayed formula	

Gridlock 3 – answers

name		displayed formula	
propane	pentane	$ \begin{array}{ccccccc} & H & H & H & H & H & \\ & & & & & & \\ H & -C & -C & -C & -C & -C & -H \\ & & & & & & \\ & H & H & H & H & H & \end{array} $	$ \begin{array}{ccccccc} & H & H & & & & \\ & & & & & & \\ H & -C & -C & -H & & & \\ & & & & & & \\ & H & H & & & & \end{array} $
ethane	hexane	$ \begin{array}{ccccccc} & H & H & H & & & \\ & & & & & & \\ H & -C & -C & -C & -H & & \\ & & & & & & \\ & H & H & H & & & \end{array} $	$ \begin{array}{ccccccc} & H & H & H & H & H & \\ & & & & & & \\ H & -C & -C & -C & -C & -C & -H \\ & & & & & & \\ & H & H & H & H & H & \end{array} $
$ \begin{array}{ccccccc} & H & H & H & H & H & \\ & & & & & & \\ H & -C & -C & -C & -C & -C & -H \\ & & & & & & \\ & H & H & H & H & H & \end{array} $	$ \begin{array}{ccccccc} & H & H & H & & & \\ & & & & & & \\ H & -C & -C & -C & -H & & \\ & & & & & & \\ & H & H & H & & & \end{array} $	C_2H_6	C_6H_{14}
$ \begin{array}{ccccccc} & H & H & H & H & H & \\ & & & & & & \\ H & -C & -C & -C & -C & -C & -H \\ & & & & & & \\ & H & H & H & H & H & \end{array} $	$ \begin{array}{ccccccc} & H & H & & & & \\ & & & & & & \\ H & -C & -C & -H & & & \\ & & & & & & \\ & H & H & & & & \end{array} $	C_5H_{12}	C_3H_8
displayed formula		formula	