

# gridlocks – can you unlock the grid?

## Indicators

Before you answer the puzzles below fill in the table of four indicators using:

colourless

universal indicator

red

yellow

indicator	colour in acid	colour in alkali	$pK_a$ ( $pK_{in}$ )
phenolphthalein		pink	9
methyl orange	red		4
litmus		blue	7
	yellow-red	blue-purple	various

### Gridlock 1

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

indicator		colour in acid	
	phenolphthalein		yellow-red
			colourless
yellow			litmus
colour in alkali		indicator	

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## Gridlock 2

Each row, column and 2 x 2 box contains information about each of the four indicators in the table.

indicator		colour in acid	
phenolphthalein			yellow-red
	universal indicator		
			9
		4	
colour in alkali		pKa	

## Gridlock 3

Each row, column and 2 x 2 box contains information about each of the four indicators in the table.

indicator		colour in acid	
methyl orange			
		yellow-red	
		9	
	blue		
colour in alkali		pKa	

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## Indicators – answers

Before you answer the puzzles below fill in the table of four indicators using:

colourless

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indicator	colour in acid	colour in alkali	$pK_a$ ( $pK_{in}$ )
phenolphthalein	colourless	pink	9
methyl orange	red	yellow	4
litmus	red	blue	7
universal indicator	yellow-red	blue-purple	various

## Puzzle 1 – answers

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

indicator		colour in acid	
litmus	phenolphthalein	red	yellow-red
universal indicator	methyl orange	red	colourless
pink	blue	universal indicator	methyl orange
yellow	blue-purple	phenolphthalein	litmus
colour in alkali		indicator	

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## Puzzle 2 – answers

Each row, column and 2 x 2 box contains information about each of the four indicators in the table.

indicator		colour in acid	
phenolphthalein	methyl orange	red	yellow-red
litmus	universal indicator	colourless	red
yellow	blue	various	9
blue-purple	pink	4	7
colour in alkali		pKa	

## Puzzle 3 – answers

indicator		colour in acid	
methyl orange	universal indicator	red	colourless
litmus	phenolphthalein	yellow-red	red
blue-purple	yellow	9	7
pink	blue	4	various
colour in alkali		pKa	