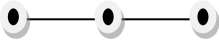
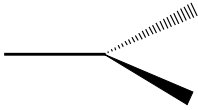
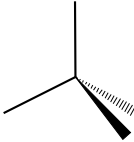
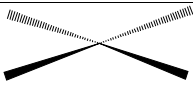
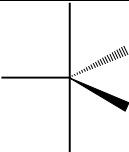
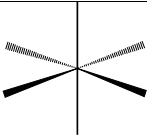


Shapes of molecules: hybrid orbitals

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

	square planar	180°	90°	trigonal planar
hybrid orbital	geometry	undistorted bond angle	drawing	example
sp	linear			BeCl ₂
sp ²		120°		BF ₃
sp ³	tetrahedral	109.5°		CH ₄
sp ² d		90		XeF ₄
sp ³ d	trigonal bipyramidal	120° & 90°		PCl ₅
sp ³ d ²	octahedral			SF ₆

Gridlock 1


Each row, column and 2 x 2 box contains information about the linear, trigonal planar, tetrahedral and octahedral geometries. Use your problem solving skills and the answers in the table above to fill in the blank boxes.

hybrid orbital		geometry	
	sp		octahedral
			linear
trigonal planar			sp ³
geometry		hybrid orbital	

gridlocks – can you unlock the grid?

Gridlock 2

This puzzle is based on geometries with 4, 5 or 6 bonds.

hybrid orbital		geometry	
sp^3d^2			trigonal bipyramidal
			
109.5°			
bond angle		drawing	

Gridlock 3

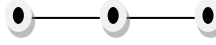
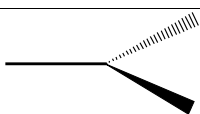
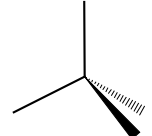
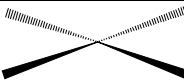
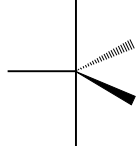
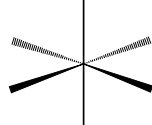
In puzzle 3 you need to first work out which of the geometries are in the puzzle and then solve it.

hybrid orbital		geometry	
sp			trigonal bipyramidal
	sp^3d	linear	
	109.5°		
		BF_3	
bond angle		example	

Shapes of molecules: hybrid orbitals

Answers

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

	square planar	180°	90°	trigonal planar	
hybrid orbital	geometry	undistorted bond angle	drawing	example	
sp	linear	180°		BeCl ₂	
sp ²	trigonal planar	120°		BF ₃	
sp ³	tetrahedral	109.5°		CH ₄	
sp ² d	square planar	90		XeF ₄	
sp ³ d	trigonal bipyramidal	120° & 90°		PCl ₅	
sp ³ d ²	octahedral	90°		SF ₆	

Puzzle 1 – answers

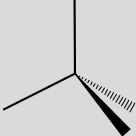
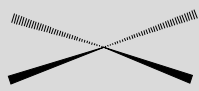
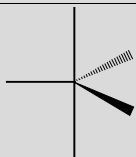
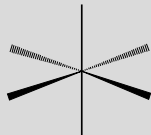
Each row, column and 2 x 2 box contains information about the linear, trigonal planar, tetrahedral and octahedral geometries. Use your problem solving skills and the answers in the table above to fill in the blank boxes.

hybrid orbital		geometry	
sp ³	sp	trigonal planar	octahedral
sp ³ d ²	sp ²	tetrahedral	linear
linear	tetrahedral	sp ³ d ²	sp ²
trigonal planar	octahedral	sp	sp ³
geometry		hybrid orbital	

gridlocks – can you unlock the grid?

Puzzle 2 – answers

This puzzle is based on geometries with 4, 5 or 6 bonds.

hybrid orbital		geometry	
sp^3d^2	sp^3	square planar	trigonal bipyramidal
sp^2d	sp^3d	octahedral	tetrahedral
120° & 90°	90°		
109.5°	90°		
bond angle		drawing	

Puzzle 3 – answers

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

hybrid orbital		geometry	
sp	sp^2	tetrahedral	trigonal bipyramidal
sp^3	sp^3d	linear	trigonal planar
120°	109.5°	PCl_5	$BeCl_2$
120° & 90°	180°	BF_3	CH_4
bond angle		example	