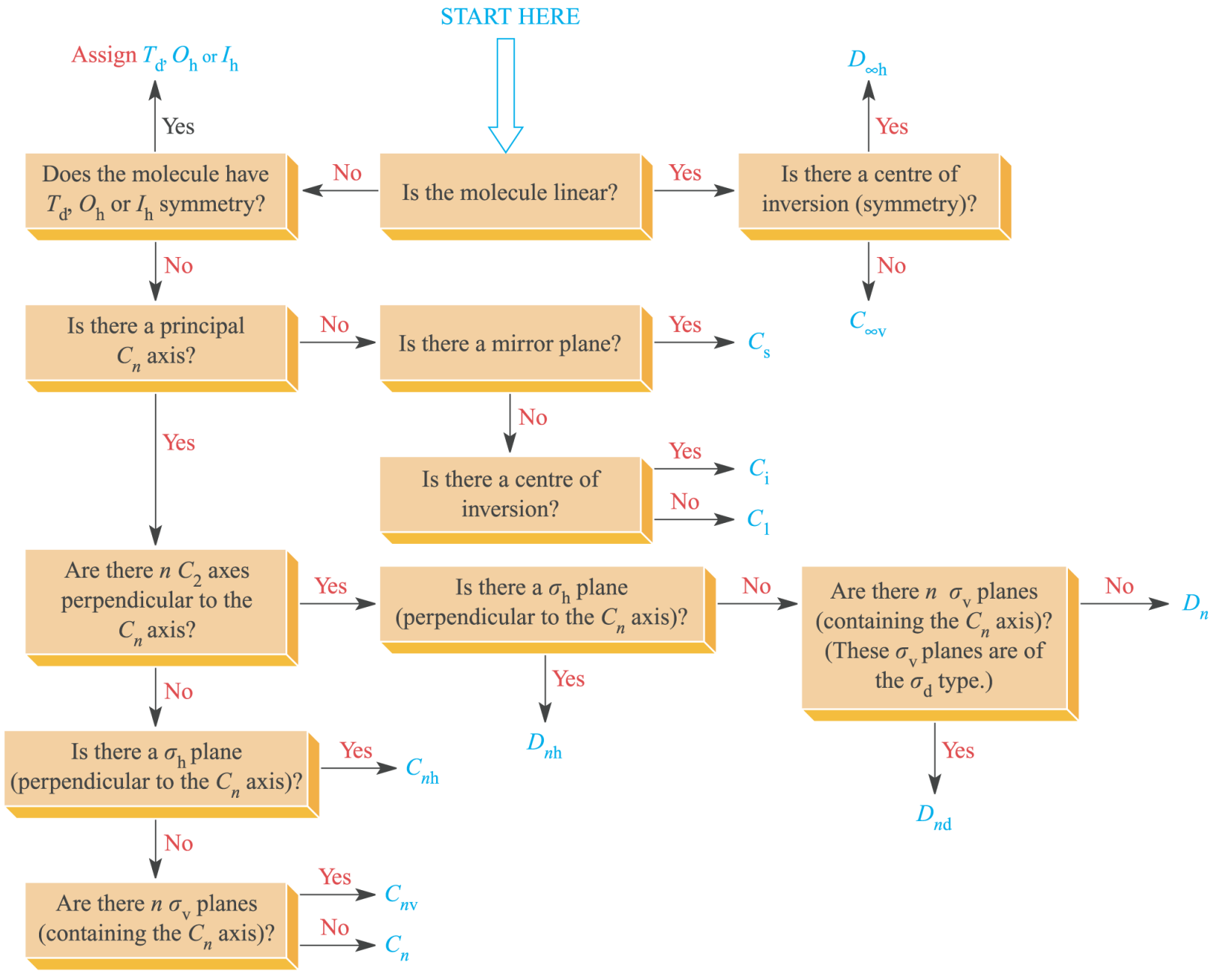
Point group	Characteristic symmetry elements	Comments
C_s	E, one σ plane	
C_i	E, inversion centre	
C_n	E, one (principal) n-fold axis	
C_{nv}	E, one (principal) n-fold axis, n σ_v planes	
C_{nh}	E, one (principal) n-fold axis, one σ_h plane, one S_n-fold axis which is coincident with the C_n axis	The S_n axis necessarily follows from the C_n axis and σ_h plane For $n = 2$, 4 or 6, there is also an inversion centre
D_{nh}	E, one (principal) n-fold axis, n C_2 axes, one σ_h plane, n σ_v planes, one S_n-fold axis	The S_n axis necessarily follows from the C_n axis and σ_h plane For $n = 2$, 4 or 6, there is also an inversion centre
D_{nd}	E, one (principal) n-fold axis, n C_2 axes, n σ_v planes, one S_{2n}-fold axis	For $n = 3$ or 5, there is also an inversion centre
T_d		Tetrahedral
O_h		Octahedral
I_h		Icosahedral


START HERE
Is the molecule linear?
Yes
Is there a centre of inversion (symmetry)?
Yes
$D_{\infty h}$
No
$C_{\infty v}$
No
Does the molecule have T_d, O_h or I_h symmetry?
Yes
Assign T_d, O_h or I_h
No
Is there a principal C_n axis?
No
Is there a mirror plane?
Yes
C_s
No
Is there a centre of inversion?
Yes
C_i
No
C_1
Yes
Are there n C_2 axes perpendicular to the C_n axis?
Yes
Is there a σ_h plane (perpendicular to the C_n axis)?
Yes
D_{nh}
No
Are there n σ_v planes (containing the C_n axis)? (These σ_v planes are of the σ_d type.)
Yes
D_{nd}
No
D_n
No
Is there a σ_h plane (perpendicular to the C_n axis)?
Yes
C_{nh}
No
Are there n σ_v planes (containing the C_n axis)?
Yes
C_{nv}
No
C_n

Complex	Point group
$M(CO)_6$	O_h
$M(CO)_5X$	C_{4v}
trans-$M(CO)_4X_2$	D_{4h}
cis-$M(CO)_4X_2$	C_{2v}
fac-$M(CO)_3X_3$	C_{3v}
mer-$M(CO)_3X_3$	C_{2v}

http://symmetry.otterbein.edu/tutorial/pointgroups.html

http://www.reciprocalnet.org/edumodules/symmetry/pointgroups/index.html