Drawing Cyclohexane and Decalins
Drawing Cyclohexane

parallel bonds
equatorial bonds
axial bonds
Numbering
Cyclohexane
Start anywhere and number consecutive carbons.
Tetrahedral Carbons in Cyclohexane
tetrahedral carbon
tetrahedral carbon
tetrahedral carbon
tetrahedral carbon
tetrahedral carbon
tetrahedral carbon
Disubstituted Isomers of Cyclohexane
trans-1,2-diequatorial
and...
trans-1,2-diaxial
are conformational isomers of one another, and...
cis-1,3-diequatorial
and...
cis-1,3-diaxial
are conformational isomers of one another, and...
trans-1,4-diequatorial
and...
trans-1,4-diaxial
are conformational isomers of one another.
Chair Conformations of Cyclohexane
hold red bonds in a plane
flip this carbon above the plane
flip the other carbon below the plane
the other chair conformation

you get
number carbons in this conformation

number the same carbons in this conformation
given the plane formed by carbons 2, 3, 5, and 6

C₁ is below the plane and...

given the plane formed by carbons and 2, 3, 5, and 6

C₄ is above the plane, while...

C₄ is below the plane.

C₁ is above the plane and...
equatorial bonds here, and axial bonds here, and equatorial bonds here.

axial bonds here, hence become...
Equatorial bonds alternate being above and below the axial bonds on a given carbon atom.
and...
axial bonds alternate being above and below the equatorial bonds on a given carbon atom.
Drawing Decalins
Start with a chair cyclohexane

Add two vicinal equatorial bonds

Complete a second chair cyclohexane

Axial fusion bonds are diaxial to rings A and B.
Start with a chair cyclohexane

Add two vicinal bonds: **One equatorial; one axial**

Complete a 2nd chair cyclohexane

**Ring fusion substituents are cis to rings A and B.**

Substituent X is equatorial to ring A and axial to ring B while substituent Y is equatorial to ring B and axial to ring A.
cis - Decalins

Start with a chair cyclohexane

Add two vicinal bonds: 
**One axial; one equatorial**

Complete a 2nd chair cyclohexane

Ring fusion substituents are **cis** to rings A and B.

Substituent X is now axial to ring A and equatorial to ring B while substituent Y is now axial to ring B and equatorial to ring A.
cis - Decalins

**cis - Decalin Conformation 1**

rotate clockwise 90°

**cis - Decalin Conformation 2**

Enantiomers but equal in energy
The End