## **Review:**



## **Properties of Haloalkanes:**

- if % composition > 65% halogen by weight, then more dense than water
- $\rho = \text{density} > 1.0 \text{ g/cm}^3 \text{ (water)}$
- immiscible (insoluble) in H<sub>2</sub>O
- governed primarily by dipole-dipole interactions
- good solvents for organic compounds eg. Dichloromethane and Chloroform
- High MP and BP relative to hydrocarbons of similar molecular weight

Ex) Halothane

$$H = \begin{bmatrix} C & F \\ -C & -C \\ B & F \end{bmatrix}$$
 1,1,1-trifluoro-2-bromo-2-chloroethane

Ex) Refrigerants

Ex)

1,1-dibromo-2-chloroethane

In adult male, sperm count is typically 100million/mL - can be reduced to 0 by these antifertility agents

## **Stereochemistry and Chirality:**

Chiral object (molecule): has a non-superimposable mirror image

Achiral object (not chiral)

- Louis Pasteur 1848

Resolution - Separation of right and left-handed forms (enantiomers)

Enantiomers: molecules that are stereoisomers and are non-superimposable mirror images of each other

Diastereomers: Stereoisomers that are not enantiomers.

## Structure comparison:



Non-superimposable mirror images: Stereoisomers -> Enantiomers

Ex) Chiral Molecule, non-superimposable mirror image;



**Chiral Molecule = Non-Superimposable** 

Ex) Achiral Molecule; the mirror image is superimposable;



Trans-2-butene is achiral.

All stereoisomers that are not enantiomers are diastereoisomers.

- Mirror
- If you have a mirror plane of symmetry within a molecule  $\rightarrow$  Achiral

Consider these two molecules, they are diastereomers of each other:



trans-2-Butene

cis-2-Butene

More example:





- identical compounds