

# **Properties of Liquids**

**surface tension**

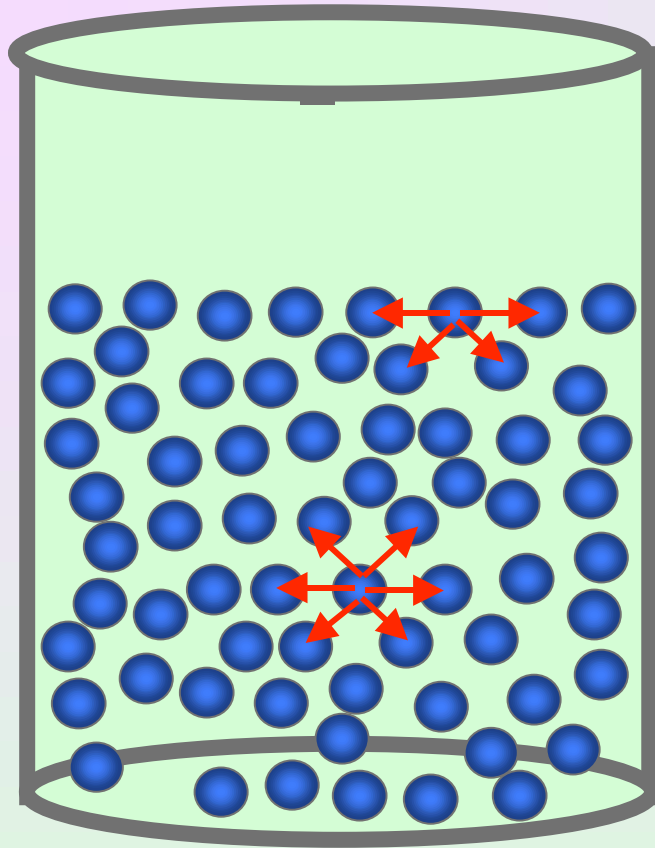
**viscosity**

# **Surface tension**

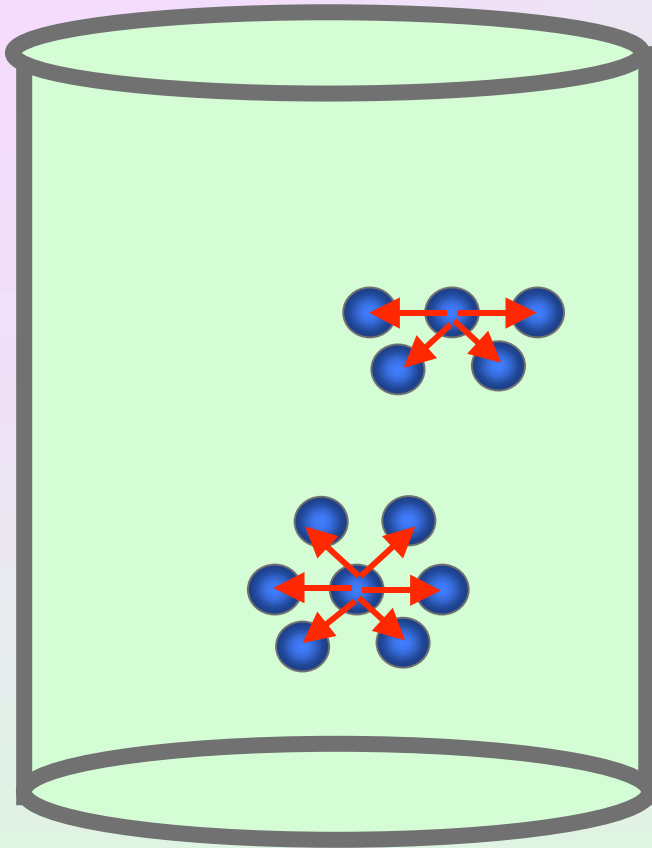
**the tendency of a liquid to minimize  
its surface**

**or**

**the amount of energy needed to  
stretch or increase the surface area**



**Intermolecular forces acting on a molecule in the surface layer of a liquid and the interior region of the liquid**



**Intermolecular forces acting on a molecule in the surface layer of a liquid and the interior region of the liquid**

**Easier for an individual molecule to escape to the gas phase from the surface of a liquid than the interior**

# What affects surface tension?

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**High surface tension is related to strong intermolecular forces**

**Water: 73 dynes/cm**

**principal intermolecular force is hydrogen bonding**

**Octane( $C_8H_{18}$ ): 22 dynes/cm**

**principal intermolecular force is induced dipole- induced dipole**

# Capillary Action

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is a manifestation of surface tension  
an example is water rising in a narrow tube  
two forces (**cohesion** and **adhesion**) are  
involved

**Cohesion:** is the attraction between  
molecules of the liquid

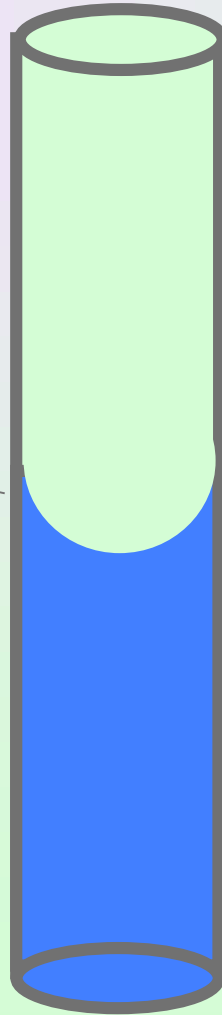
**Adhesion** : attractive forces between  
the liquid and the glass

# Capillary Action

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**meniscus**

**H<sub>2</sub>O**

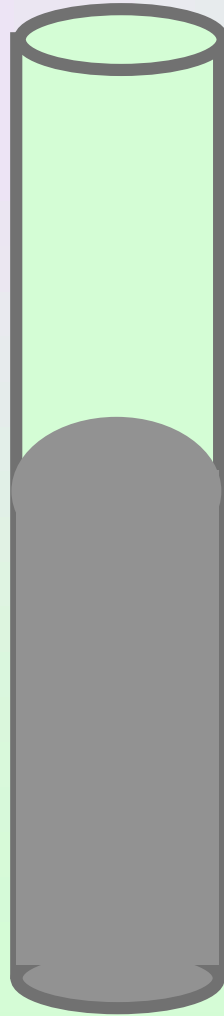


**adhesive forces are  
stronger than the  
cohesive forces**

# Capillary Action

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**Hg**



**cohesive forces are  
stronger than the  
adhesive forces**

# viscosity

**a measure of a liquid's  
resistance to flow**

## Viscosity of some common liquids at 20° C

liquid	Viscosity*
$\text{H}_2\text{O}$	$1 \times 10^{-3}$
$\text{HOCH}_2\text{CH}_2\text{CH}_2\text{OH}$	1.5
$\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$	$2 \times 10^{-4}$

\*units are Newton seconds per square meter  
(N s /m<sup>2</sup>)