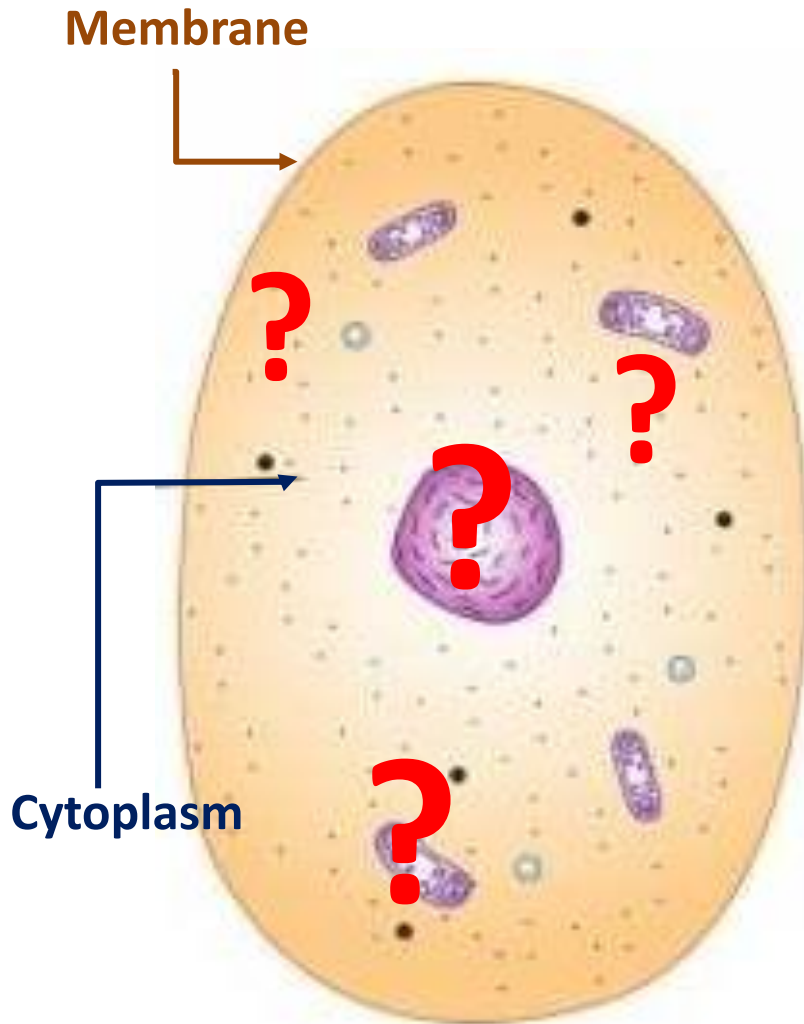


# Cell Composition

All cells consist of a **cytoplasm** enclosed within a **membrane**.



- All cells have the same basic chemical composition.
- **Membrane** is made of water insoluble lipids.
- **Cytoplasm** is a gelatinous liquid composed of a mixture of small molecules (ions, amino acids, sugars and **70-90% water**), and macromolecules which are essential to the cell's functions.

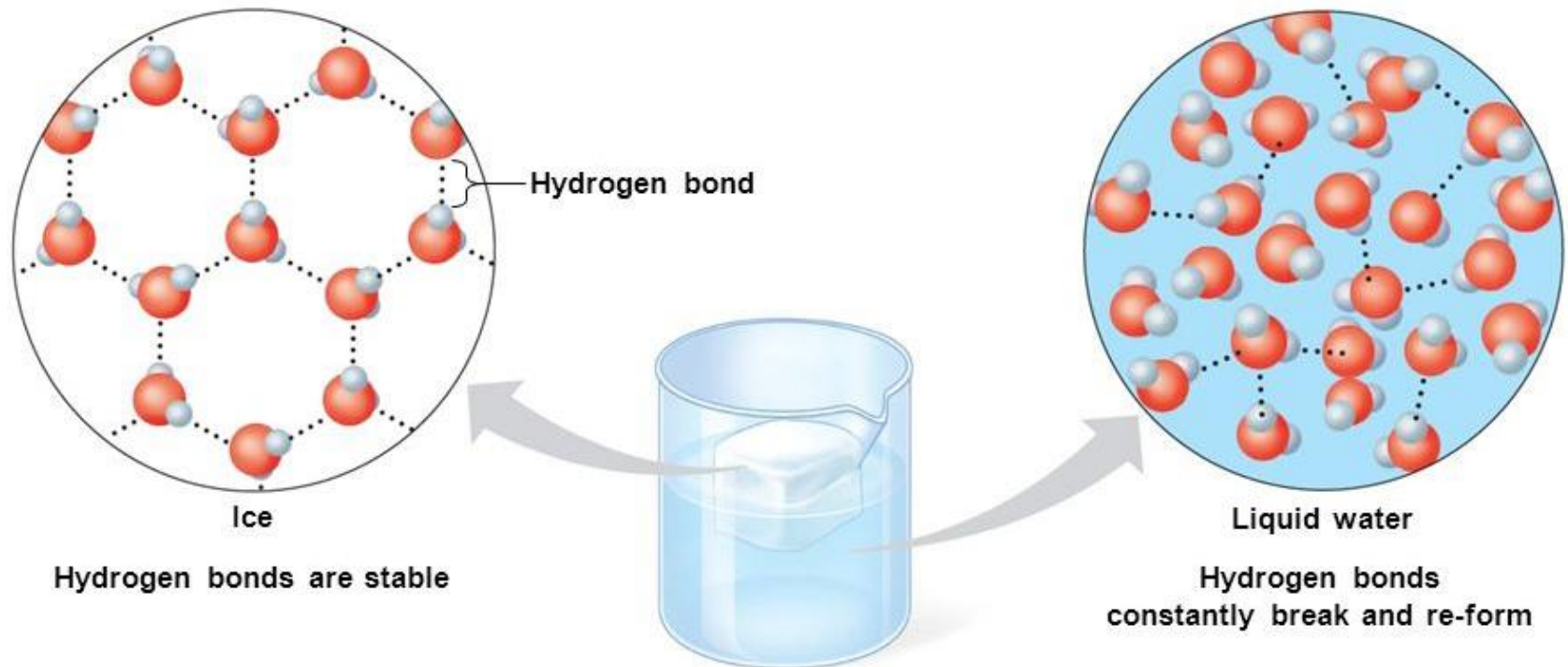
# Amazing Water

- Water is the only substance on Earth that naturally exists as **solid** and **liquid** and **gas**.



- Water is the substance that is **necessary for any form of life** as we know it. It is **directly involved in many chemical reactions** to build and break down important components of the cell.

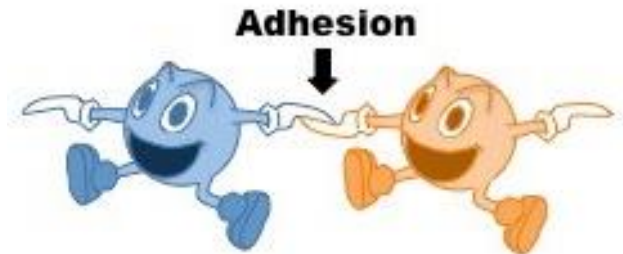
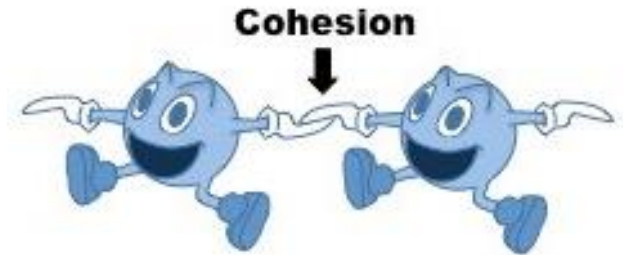
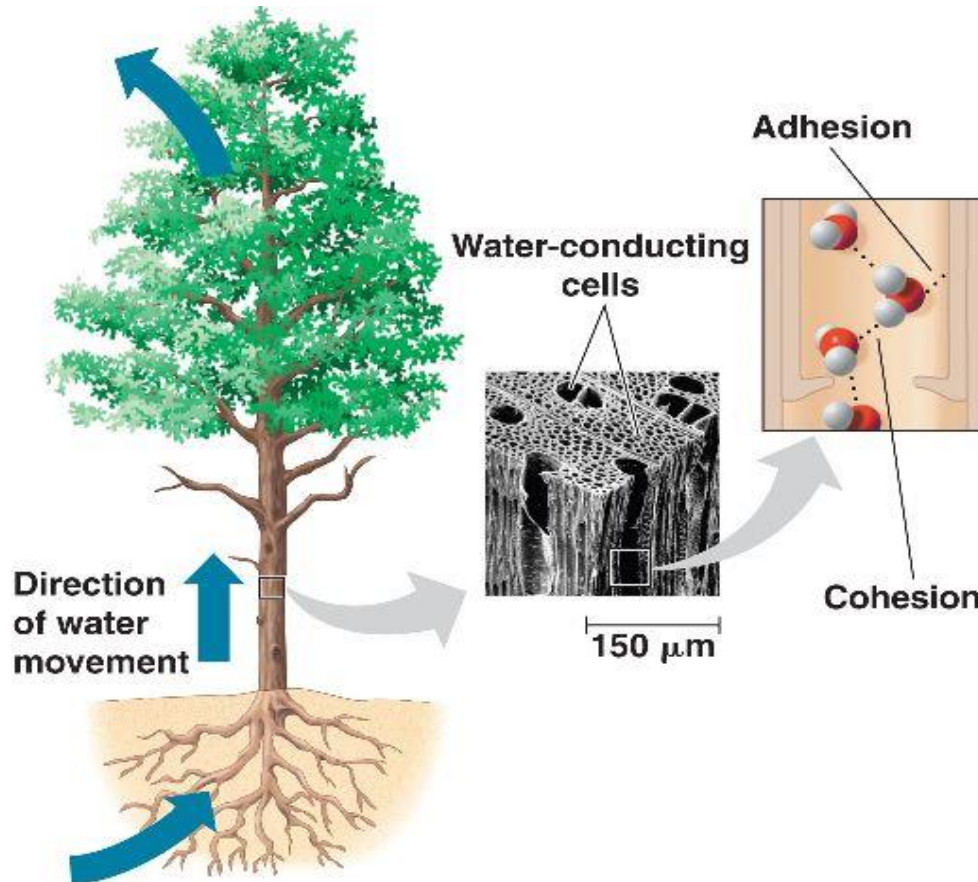
# **Water** is less dense as a solid than as a liquid.



- **This means that ice is less dense than liquid water, and therefore it floats. This property is important, as it keeps ponds, lakes, and oceans from freezing solid and allows life to continue to thrive under the icy surface.**

**Water** has strong cohesive and adhesive forces: water molecules are attracted to one another and to other materials.

- This is essential for fluid transport in many different forms of life.



- For example, cohesion and adhesion combined allow nutrients to be transported to the top of a tree against the force of gravity.



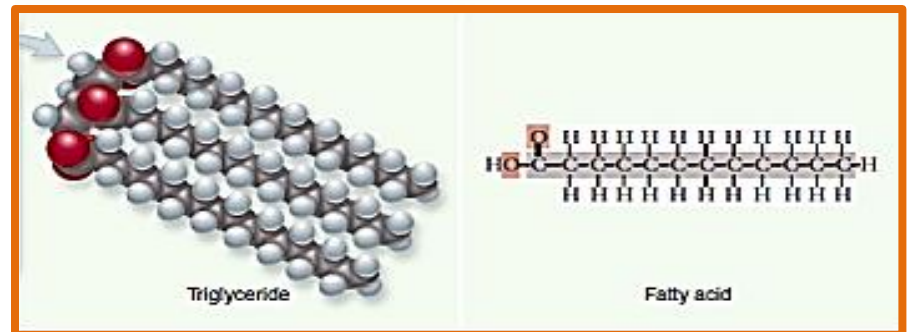
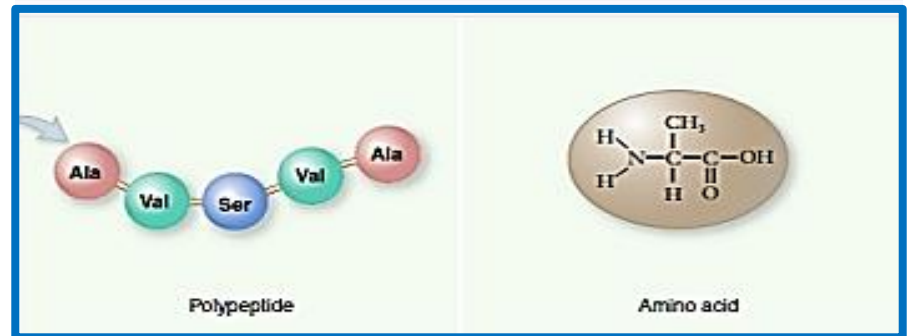
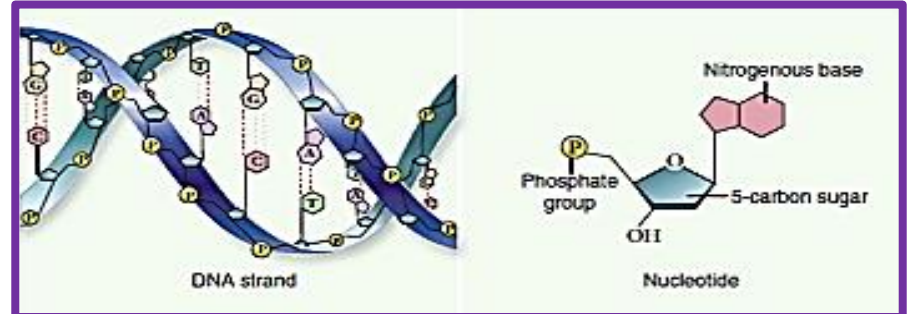
- Carbohydrates

- Nucleic acids

Four major classes of intracellular macromolecules (large biological molecules)

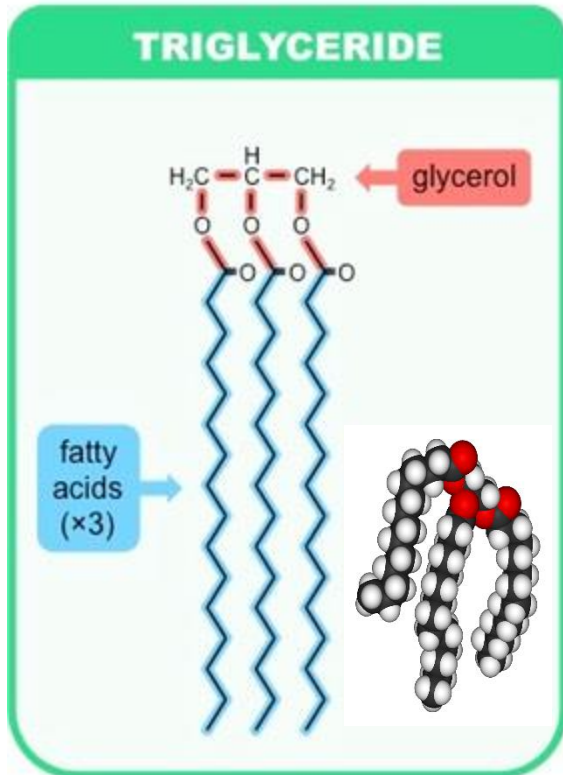
- Proteins

- Lipids

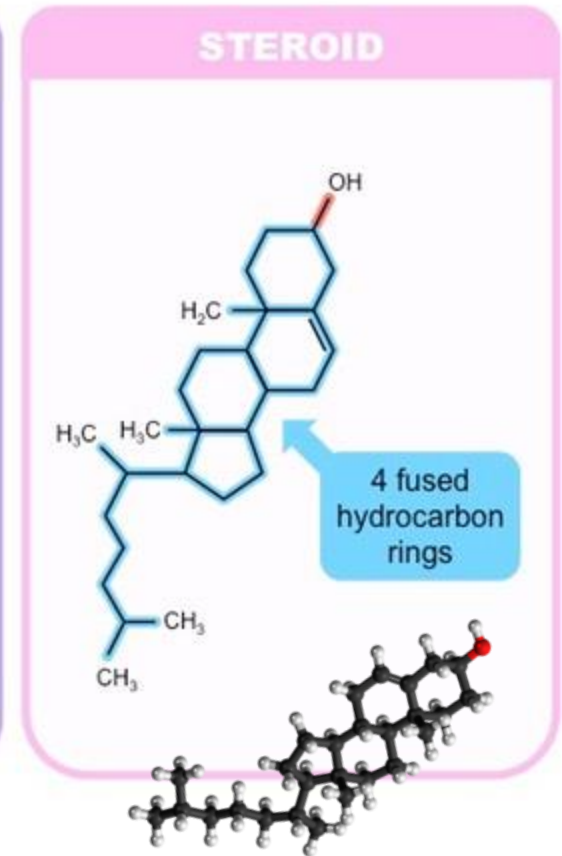
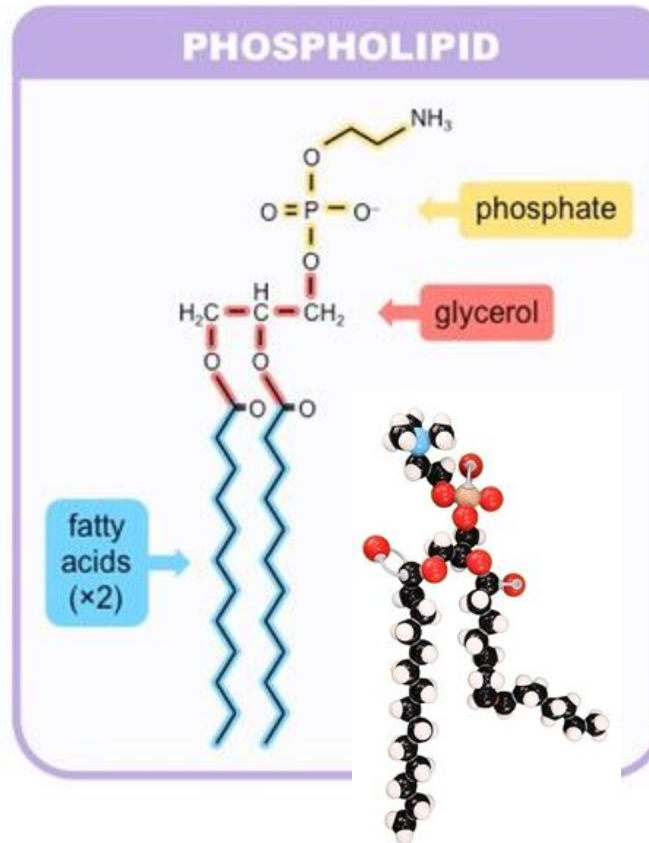


# Lipids

are long chains of hydrocarbon molecules insoluble in water



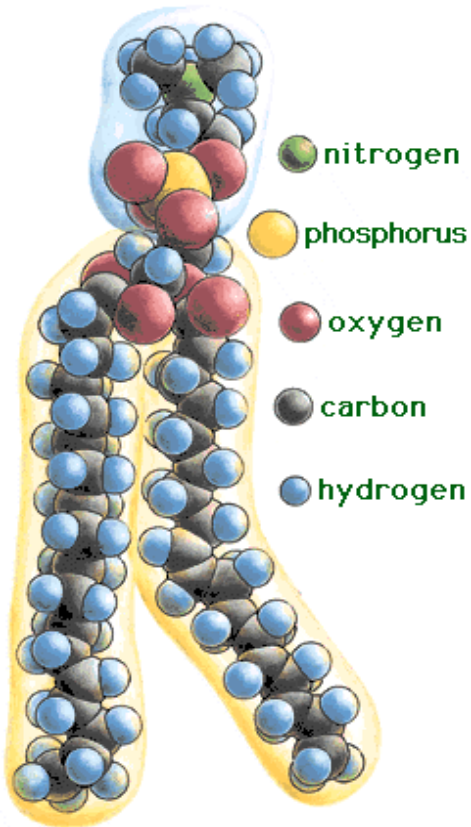
(fats and oils)



Lipids are **components of cell membranes**; they are also involved in energy storage, as well as relaying signals within cells.

# Phospholipids

make up a  
continuous  
**bi-layer** barrier  
around all cells,  
the fundamental  
structure of cell  
membranes



**Hydrophobic**  
(water-repelling)  
**tail**

**Hydrophilic**  
(water-attracting)  
**head**

