

# Introduction

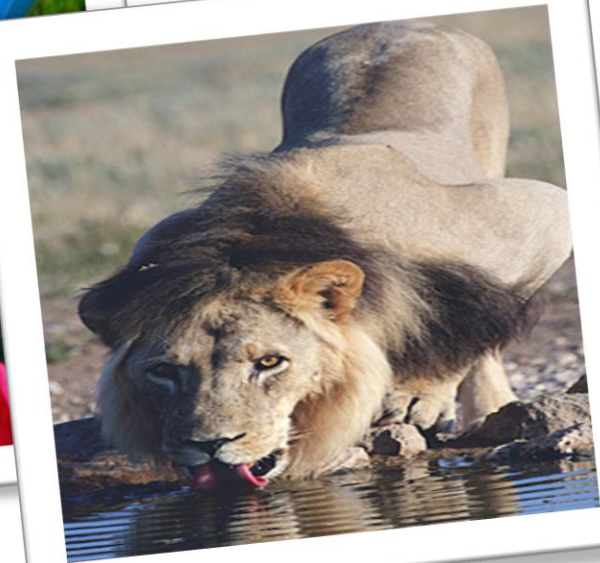
Do you know **Water** is the most important compound in living organisms?



Fig. 1



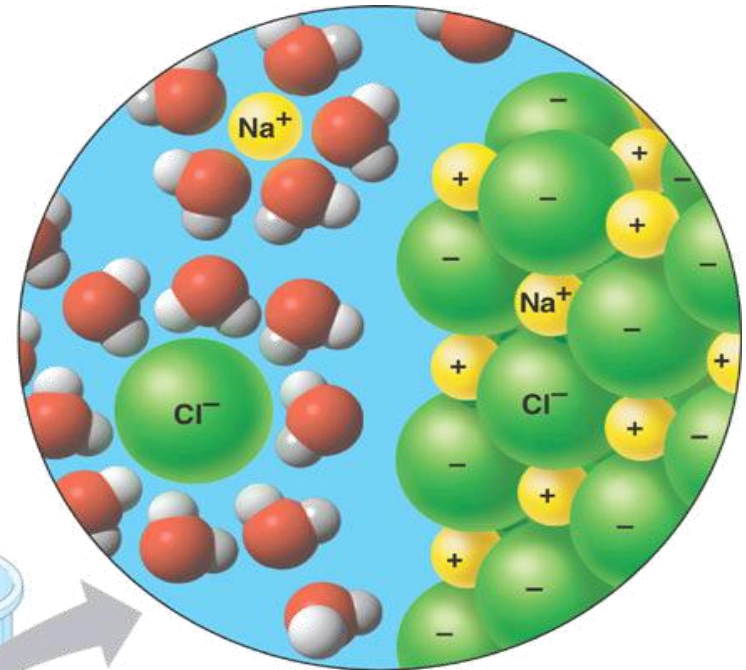
Fig. 2



# Water as Universal Solvent (For Polar molecules and Ions)

- The solvent properties of water are greatest with respect to polar molecules because “spheres of hydration” are formed around the (dissolved) molecules.

- For example, the  $\text{Na}^+$  of salt attracts the negative end of water molecules while the  $\text{Cl}^-$  attracts the positive end.

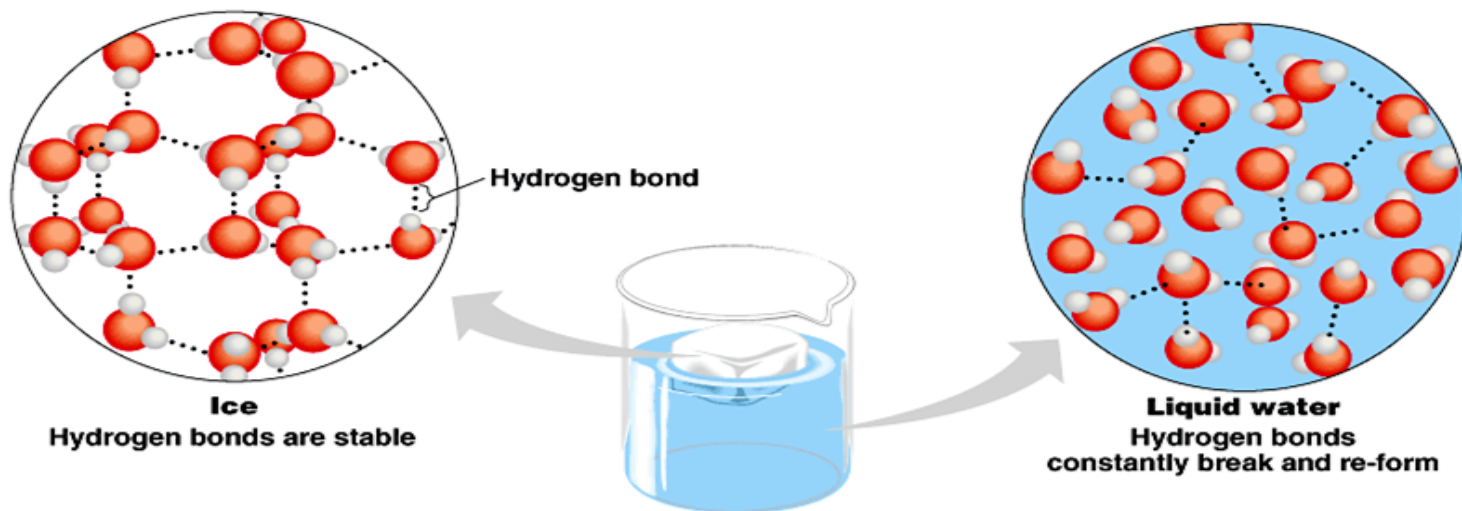


# Water's Polarity Leads to Hydrogen Bonding and Other Unusual Properties

2

## Water Expands When It Freezes

- Water is one of the few substances that expands when it freezes.
- Ice is less dense than liquid water so it floats as it forms in a body of water. *\*most dense at 4° C*



# Properties of Water

[ Click on each button for more details.]

Cohesion

Surface  
Tension

Adhesion

Capillarity

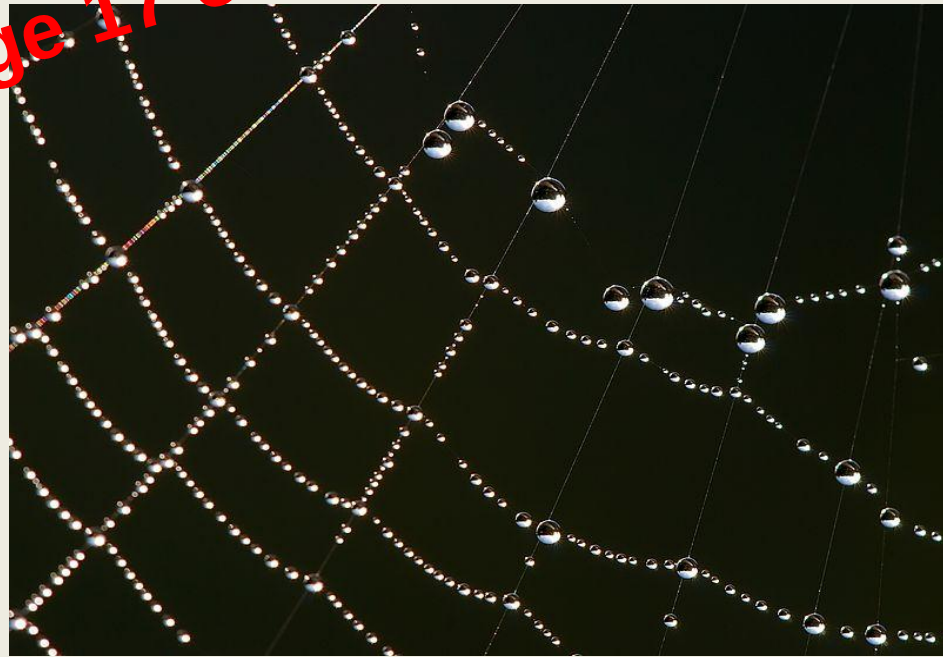


Fig. 6

**Adhesion** is the tendency of molecules to be attracted to ones of a different type.

# Importance of Water to Living Organisms

[ Click on each hypertext for more details.]

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1. Metabolic Role of Water
2. Water as a Solvent
3. Water as a Lubricant
4. Supporting Role of Water
5. Miscellaneous Functions of Water

## Metabolic Role of Water

- Hydrolysis
- Medium for chemical reactions
- Diffusion and osmosis
- Photosynthetic substrate/raw material



# Appendix

| Figure | Source                                                                                                                                                                                                    |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fig.7  | <a href="http://vision.eecs.ucf.edu/projects/pingkun/sprefImages/capillary.gif">http://vision.eecs.ucf.edu/projects/pingkun/sprefImages/capillary.gif</a>                                                 |
| Fig. 8 | <a href="https://lmscedars.wikispaces.com/file/view/transpiration.png/44751713/transpiration.png">https://lmscedars.wikispaces.com/file/view/transpiration.png/44751713/transpiration.png</a>             |
| Fig.9  | <a href="http://2.bp.blogspot.com/-7PmIZRn4T4E/TntsKrI25TI/AAAAAAAAAAU/k5B4UjU4CC4/s1600/cohesion.jpg">http://2.bp.blogspot.com/-7PmIZRn4T4E/TntsKrI25TI/AAAAAAAAAAU/k5B4UjU4CC4/s1600/cohesion.jpg</a>   |
| Fig.10 | <a href="http://www.nano-world.org/frictionmodule/content/0200makroreibung/0600adhesionmodel/bild1.gif">http://www.nano-world.org/frictionmodule/content/0200makroreibung/0600adhesionmodel/bild1.gif</a> |
| Fig.11 | <a href="http://b3.imgsrc.ru/s/skippythehippy/2/15880632Orx.jpg">http://b3.imgsrc.ru/s/skippythehippy/2/15880632Orx.jpg</a>                                                                               |
| Fig.12 | <a href="http://dnr.wi.gov/wnrmag/2009/12/images/ice.jpg">http://dnr.wi.gov/wnrmag/2009/12/images/ice.jpg</a>                                                                                             |

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