

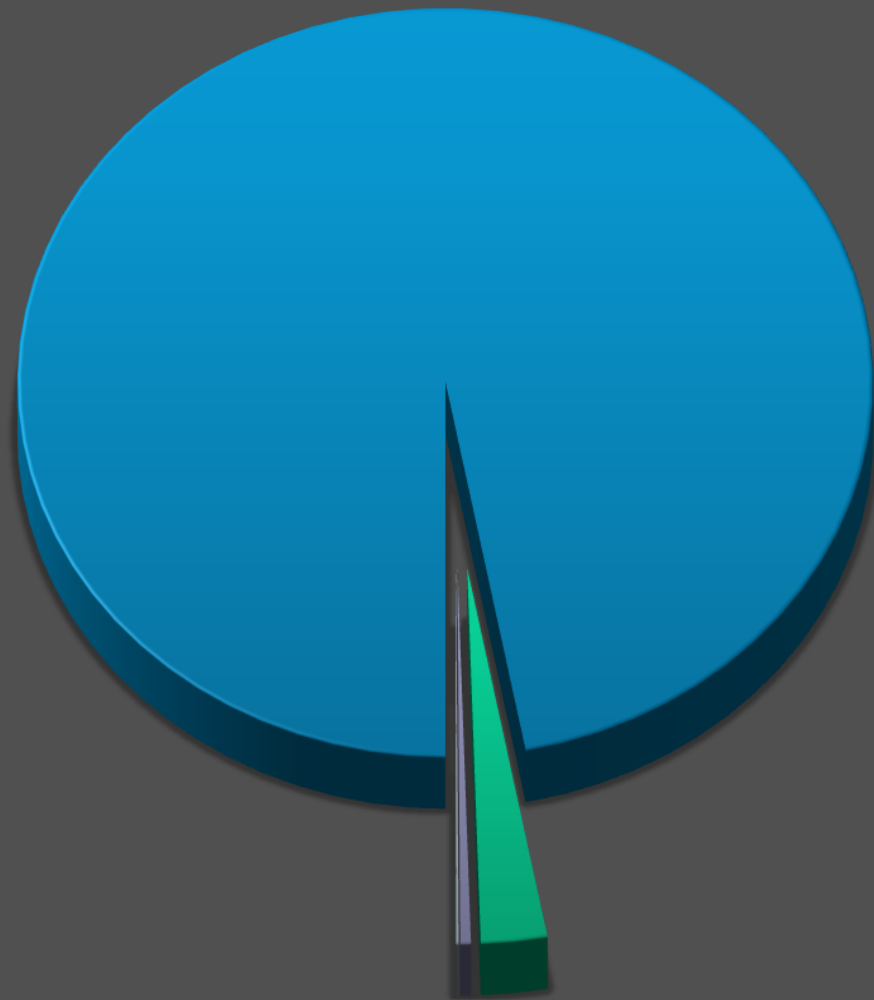
# Bell Ringer

1. What are the two 'spheres' we've covered so far in Earth Science?
2. What is the hydrosphere?

# Hydrosphere

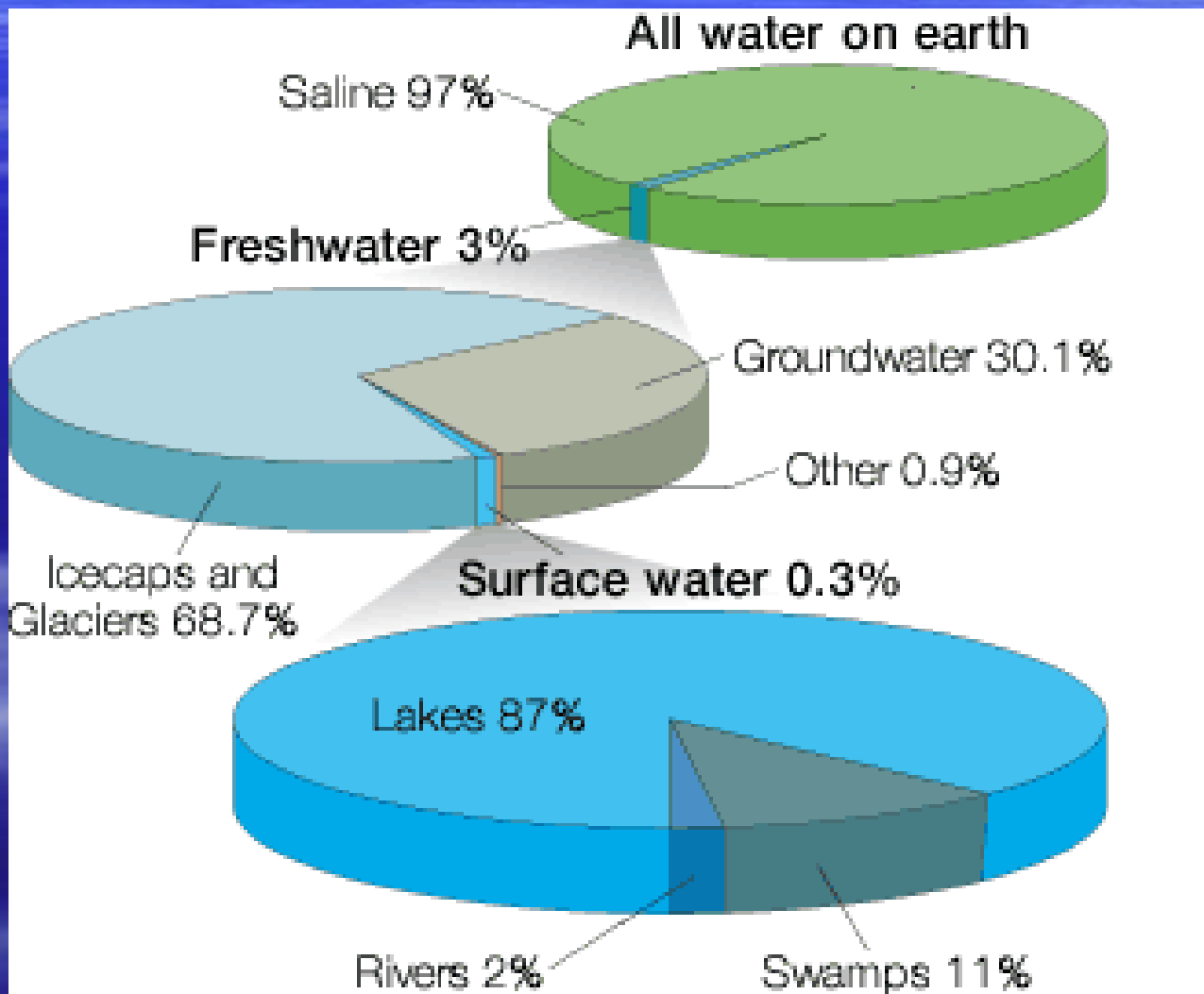
All the water on the Earth

# Water Reservoirs on Earth



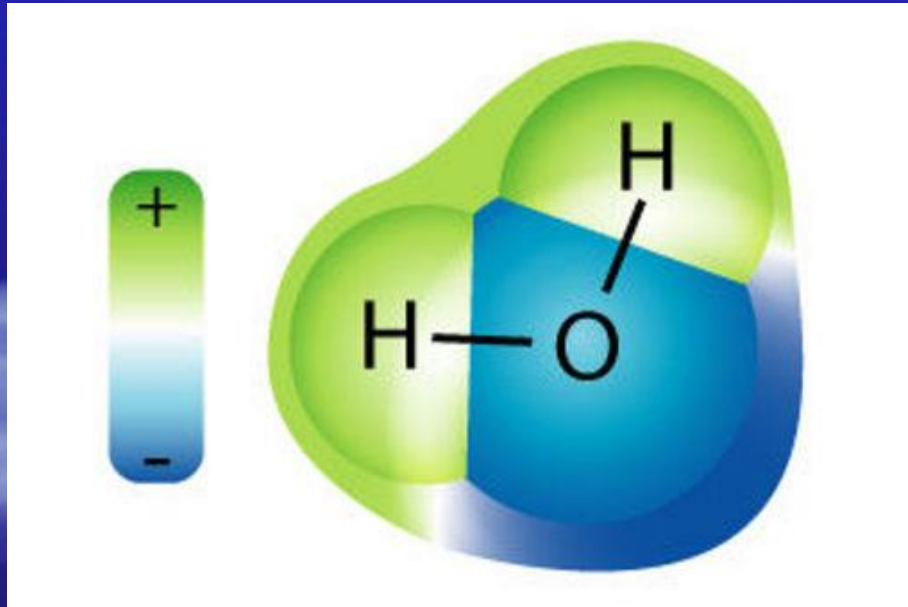
- Ocean
- Polar Ice Caps/Glaciers
- Groundwater
- Rivers/Lakes
- Atmosphere
- Biosphere

# How much is usable?



# Basic Facts about Water

- Chemical Formula:  $H_2O$
- Molecular Structure:



# Properties of Water

- Solubility
- Cohesion / Surface Tension
- Adhesion
- Phase Change
- Density

# Solubility

- Solubility: The ability of a substance to dissolve.
- What happens when you make Koolaid?



# Solubility

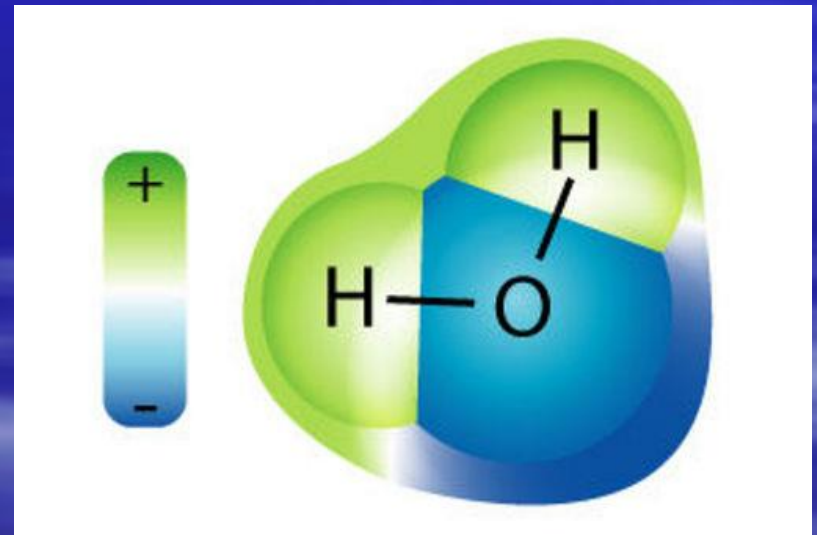
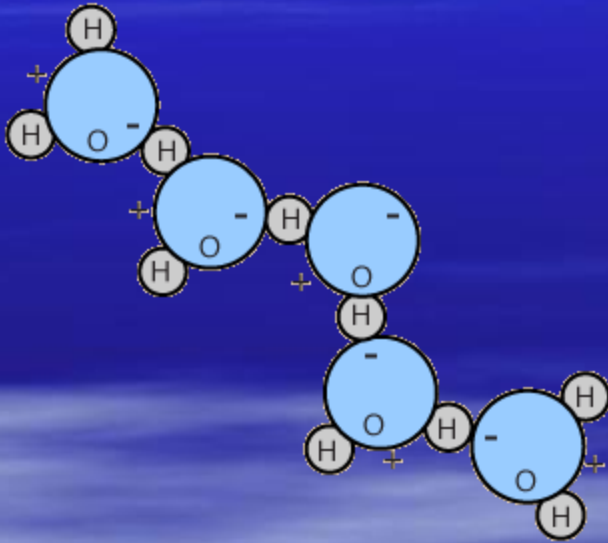
- Water can dissolve almost anything. For example, in the body water carries nutrients through tissues and carries away waste. Because it dissolves almost anything, it is easily polluted.





# Polar Molecule

Water is a polar molecule. It has both a positive and a negative side.



# Solubility

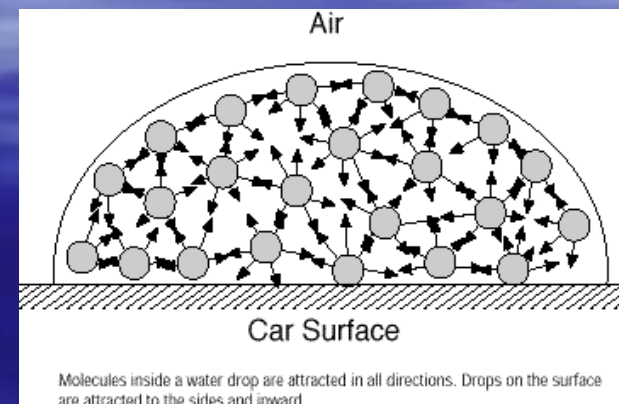
- Polar molecules will dissolve polar molecules. Non-polar molecules will dissolve non-polar molecules. Like dissolves like!
- A polar molecule is any molecule that is not symmetrical, making one side of the molecule have a positive charge and the other have a negative charge.

- How does a water droplet form?



# Cohesion and Surface Tension

- Cohesion: the ability of a molecule to stick to molecules of the same type.
- Water molecules are attracted to each other and will form a “skin” on the surface.
- Surface Tension: An increased attraction of molecules at the surface of a liquid.



# Adhesion

- Adhesion: The ability of different molecules to stick to each other.
- Water sticks well to other surfaces.



# Phase Changes

- Water is vital for life! It is a liquid between 0 and 100 degrees Celsius. Most life lives in temperatures in this range.
- Phase Changes: When a substance changes from solid, liquid, and gaseous states. This requires energy.

# Phase Changes

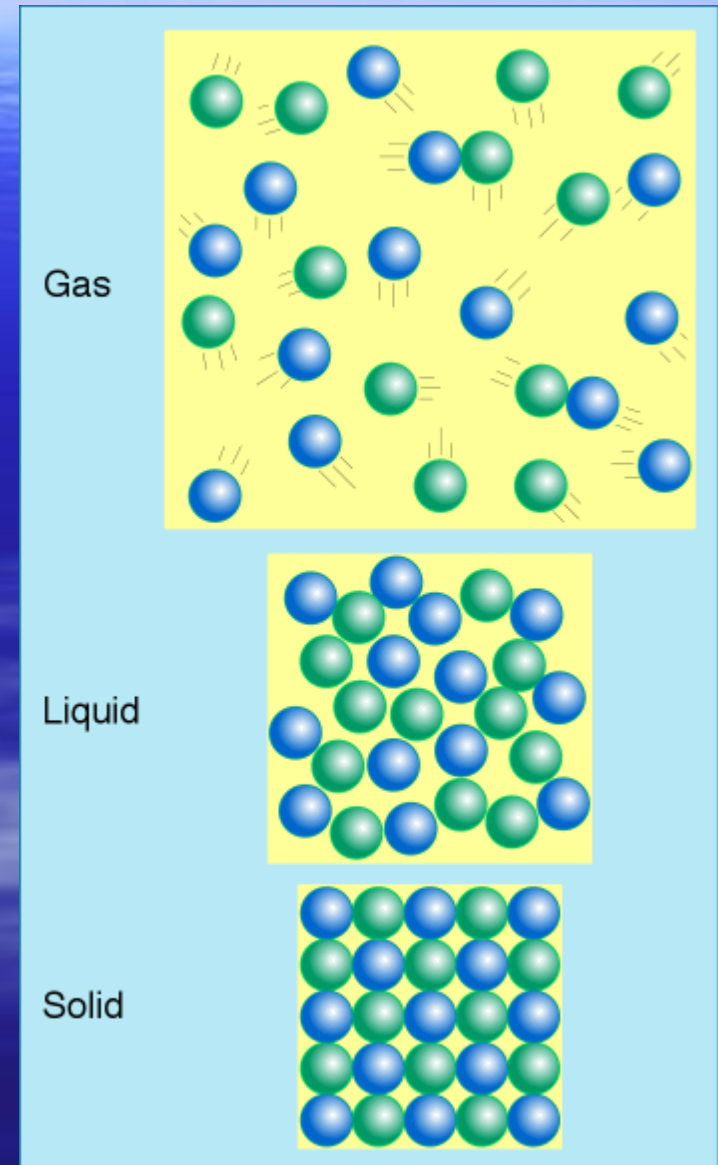
- Water changes temperature very slowly because of its high heat capacity. This moderates the climate in areas and prevents abrupt temperature changes on Earth.
- Solutes affect phase changes. For example, salt lowers the freezing point of water.





# Density

- Density = mass/volume
- Density is how closely packed molecules are.
- High Density=Closely Packed
- Water expands when it freezes, instead of contracting. This means that ice floats!



What would happen if ice sank when it froze?



## Substance

## Density

Water (liquid)

1 g/mL or 1g/cm<sup>3</sup>

Ice

.92 g/cm<sup>3</sup>

Water (gas)

.7 g/cm<sup>3</sup>

Iron

7.9 g/cm<sup>3</sup>

Wood

.75 g/cm<sup>3</sup>