Chapter 14: Chemistry of water

The hydrosphere: water
- Water covers about 71% of the Earth's surface
    - 96.5% oceans (______________)
    - 1.7% groundwater (______________)
    - 1.7% glaciers/ice caps
    - 0.01% lakes/rivers
    - 0.001% vapor/clouds/precipitation

Water (H_2O), a very unique molecule
- Water molecules interact via ____________________
- Very ______ molecule
- Solid and liquid forms have different ______________
- Absorbs heat energy
- High heat of vaporization
- Both an ______ and a ________
  $H_2O \rightleftharpoons H^+ + OH^-$

H_2O hydrogen bonds to itself
- Polar molecule
    - O has a slight ________ charge (2 lone pairs of electrons)
    - H has a slight ________ charge
- Polarity makes evaporation difficult

Water and ice
- Both have hydrogen bonds
- Ice has more structure and is ______ dense
    - _____ hydrogen bonds per molecule
    - Honeycomb-like ____________ holes in its structure
- Water is more disorganized and is ______ dense

Water, ice, and life
- Most common liquid on Earth
    - Cells are mostly water (humans ~60%)
- _________ upon freezing
    - Beneficial to aquatic life
        - Ice insulates ponds and lakes
    - Harmful to most terrestrial life
        - Ice crystals break cell walls

Water and energy
- Specific heat: the amount of heat it takes to raise ______ by ______
    - It takes a lot of energy to heat water up
    - It doesn't lose heat quickly (stays hot)
        - Impacts body temperature regulation
        - Stabilizes Earth's temperature (day vs night)
- Heat of vaporization: the ______________ required to __________
    - A lot of energy is needed to heat up a small amount of water
        - Sweat evaporating removes a lot of heat