

CHAPTER 3
Class Notes
**WATER AND THE FITNESS OF
THE ENVIRONMENT**

**I. Life on Earth has evolved
around water.**

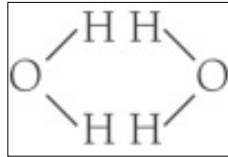
- Living cells are 70%-95% H₂O.

II. The Polarity of Water

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Question 3.1

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III. Important properties of water.

A. Cohesion

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B. Adhesion

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III. Important properties of water.

C. Water's high specific heat.

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- Heat = The total amount of kinetic energy in a substance.
- Kinetic energy = measurement of molecules in motion.

III. Important properties of water.

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- Environmental Impact-

III. Important properties of water.

D. Expansion upon Freezing

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III. Important properties of water.

Environmental Impact-

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III. Important properties of water.

E. Water is the solvent of life

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Feel comfortable with the concept of moles:

- What is a mole (mol)? What is in a 1 Molar (M) solution?

III. Important properties of water.

- **Water Dissolves**
 - Ionic compounds
 - Polar covalent compounds

- **Hydration shell-**

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Question 3.2

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IV. pH, pOH, acids, bases and buffers.

A. H_3O^+ (hydronium ions) and OH^- (hydroxide ions)

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IV. pH, pOH, acids, bases and buffers.

B. Dissociation of H_2O

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Know the subatomic particles in a hydrogen atom ($^1_1\text{H}^0$), hydrogen ion ($^1_1\text{H}^+$), and proton ($^1_1\text{H}^+$).

IV. pH, pOH, acids, bases and buffers.

C. pH

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- pH is the logarithmic measure of hydrogen ions in solution.
 - NOTE: [] represent concentration in molarity.

D. pOH

- The logarithmic measure of the hydroxide ions in solution.
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Other Useful Information and Conversion Factors

- As pH increases, the H⁺ concentration decreases (inversely proportional).
- [H⁺] is inversely proportional to [OH⁻] concentration
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- The pH is inversely proportional to the pOH.
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Take Home Questions

1. If the [H⁺] is 3.16×10^{-4} M, what is the pH?
2. If the [H⁺] is 3.16×10^{-4} M, what is the pOH?
3. What is the hydrogen ion concentration of household ammonia? The pH = 11.2

IV. pH, pOH, acids, bases and buffers.

E. pH of solutions:

1. Neutral solution = pH 7; [H⁺] = [OH⁻] (water)
2. Acidic solution = pH range 0-6.9; [H⁺] > [OH⁻] (sour taste)
3. Basic (alkaline) solution = pH range 7.1 - 14; [H⁺] < [OH⁻] (feel slippery)

**IV. pH, pOH, acids, bases
and buffers.**

F. Acids and Bases

(see table)

**IV. pH, pOH, acids, bases
and buffers.**

G. Buffers

**IV. pH, pOH, acids, bases
and buffers.**

Example: Human Blood

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