Water, \( \text{H}_2\text{O} \)

H–\( \overset{\text{●}}{\text{●}} \)–H

Lone pairs

Electron group geometry (tetrahedral)

Space-filling model  Ball-and-stick model  Geometric Sketch

https://preparatorychemistry.com/water_Canvas.html
Water Attractions

Attraction between partial positive charge and partial negative charge
Attractons exist between hydrogen and oxygen atoms of different water molecules.

Molecules break old attractions and make new ones as they tumble throughout the container.
• A *heterogeneous mixture* has two or more phases that each have a unique composition.
  – Beach sand is an example.

• A *homogeneous mixture* is composed of two or more substances but only one phase. Because the particles of the different substances are completely mixed down to the particle level, the composition of the mixture is the same throughout.
  – Filtered air is an example.
• A *solution*, also called a homogeneous mixture, is a mixture whose particles are so evenly distributed that the relative concentrations of the components are the same throughout.

• Water solutions are called *aqueous solutions*. 
Solution (Homogeneous Mixture)

All parts have the same composition.

In a salt water solution, the water, sodium ions, and chloride ions are mixed evenly throughout.

All parts taste equally salty.
• In solutions of solids dissolved in liquids, we call the solid the *solute* and the liquid the *solvent*.

• In solutions of gases in liquids, we call the gas the *solute* and the liquid the *solvent*.

• In other solutions, we call the minor component the *solute* and the major component the *solvent*. 
Liquid-Liquid Solution

Pentane, the minor component, is the solute.

Hexane, the major component, is the solvent.
Solution of an Ionic Compound

1. Anion moving out into the water

2. Collisions push the ions farther out into the water.

3. Water molecules move to disrupt the attractions to the solid.

4. Attractions between hydrogen ends of water molecules and the anions

Cation moving out into the water

Collisions push the ions farther out into the water.

Attractions between the oxygen ends of water molecules and the cations
Solution of an Ionic Compound (cont.)

Cations surrounded by the negatively charged oxygen ends of water molecules

Anions surrounded by the positively charged hydrogen ends of water molecules

Sodium chloride solution

https://preparatorychemistry.com/NaCl_Canvas.html