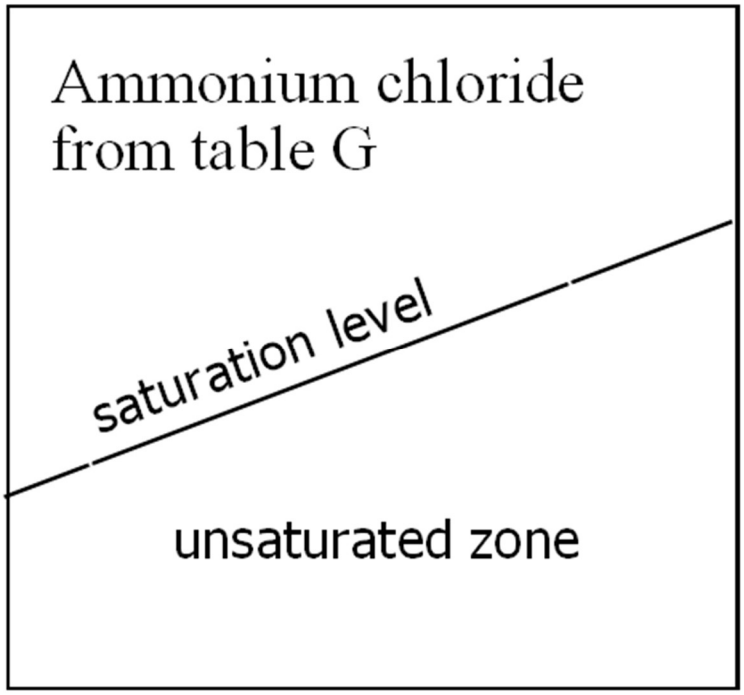
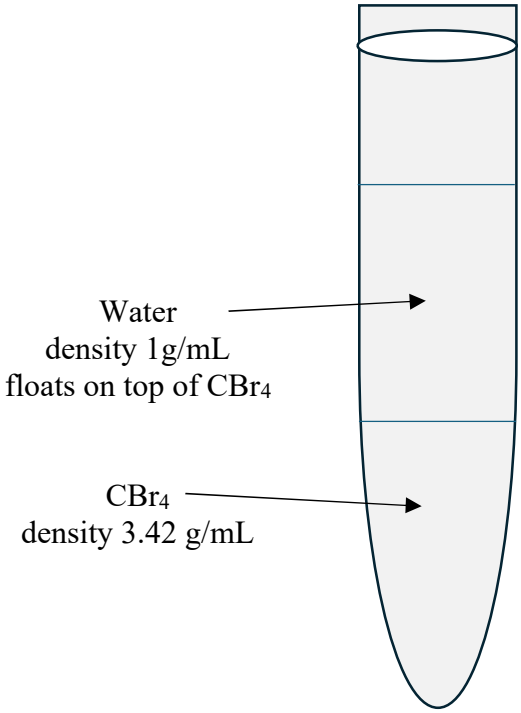
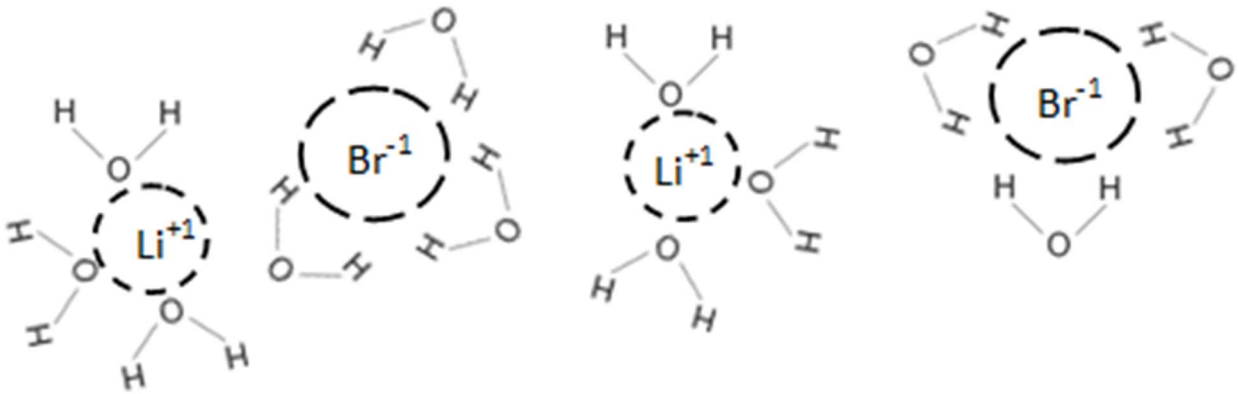
Answer Key Water 21 Questions Handout

1	Immiscible means 2 or more liquids that cannot dissolve into one another, like oil and water. Miscible means 2 or more liquids that CAN dissolve into each other, like vegetable and olive oil.
2	$NH_4Cl_{(S)} \rightarrow NH_4^{+1}{}_{(AQ)} + Cl^{-1}{}_{(AQ)}$
3	$NaHCO_{3(S)} \rightarrow Na^{+1}{}_{(AQ)} + HCO_3^{-1}{}_{(AQ)}$
4	The diagram of the water with lithium bromide ions is at the end of these answers.
5	ALL are electrolytes. Lead (II) bromide conducts melted into a liquid, others are all soluble in H_2O, so they would be aqueous and ionic, which makes them, by definition, electrolytes.
6	$C_6H_{12}O_{6(S)} \xrightarrow{\text{water}} C_6H_{12}O_{6(AQ)}$ No ions form, this is a polar molecule, like dissolves like.
7	$10°C \quad \frac{KI}{water} \quad \frac{140\ g}{100\ mL} = \frac{x\ g}{1205\ mL} \quad 100x = 168{,}700 \quad x = 1687$ grams KI (4 SF)
8	$q = mH_F \rightarrow q = (44.5\ g)(334\ J/g) = 14863\ J = 149{,}00\ J$ (3 SF)
9	The ammonium chloride graph is at the end of these answers.
10	$90°C \quad \frac{NaCl}{water} \quad \frac{40\ g}{100\ mL} = \frac{x\ g}{43\ mL} \quad 100x = 1720 \quad x = 17.2$ grams NaCl (3 SF)
10	Another name for this would be dynamic equilibrium
12	Sugar water is NOT an electrolyte. Sugar dissolves in water because it is polar; it does not have radial symmetry. It is a covalent compound, not ionic, so it cannot be an electrolyte.
13	
14	$CaCl_{2(L)}$ (melted salt) is an electrolyte because, by definition, loose mobile ions can conduct electricity
15	Carbon tetrabromide and water in a graduated cylinder is shown at the end of these answers.
16	$H_2O_{(L)} \rightarrow H^{+1}{}_{(AQ)} + OH^{-1}{}_{(AQ)}$
17	Powdered sugar dissolves faster because it has more surface area and so more of it touches the water. A cube of sugar dissolves from the outside first, the molecules "inside" the cube wait to touch water.
18	Salty water has cations and anions loose in the water. Water boils when it has enough energy to overcome both the internal attraction of hydrogen bonds to itself, and here, to the ions as well. That takes more energy. Water and $NaCl_{(AQ)}$ also must overcome the air pressure pushing onto its surface.
19	When ions are added to the snow the ions literally get in the way of the hexagonal rings of ice forming. This can lower the temperature needed to freeze water (lower temps can push the ions aside)

20	$q = mH_V \rightarrow q = (11.2\ g)(2260\ J/g) = 25312\ Joules = 25300\ J$ (3 SF)
21	Water is polar because it does not have radial symmetry
22	Soap is a surfactant, which is a chemical that disrupts the hydrogen bonding at the surface of water. The soap molecule is LARGE. Part is polar and dissolves into the water, but the rest of it is nonpolar, which gets between water molecules on the surface, creating little holes in the surface for sulfur, or bugs, to fall through.







The more negatively charged oxygen atoms are only attracted to the positively charged cations. The more positively charged hydrogen atoms are only attracted to the negatively charged anions. Water molecules orient themselves towards the ions. As the ions move around in the water, these hydrogen bonds move constantly too.