Water and Solutions Celebration 2026 Reviewed

1	$2H_2 + O_2 \rightarrow 2H_2O$ + energy Table I shows a ΔH = -483.6 kJ negative ΔH = exothermic
2	Water is a bent, polar molecule
3	The O—H bond is polar, difference in electronegativity 3.4 – 2.2 = 1.2 diff
4	3.00 M reads 3 moles per liter of solution
5	Back page of reference tables CONCENTRATION is molarity or PPM
6	Start with the solute (or stock) and finish always with water, up to the mark
7	Hydrogen bonds
8	Melting is the cold phase change $q=mH_F$
9	$q=mH_V$ = (12.00 g)(2260 J/g) = 27,120 joule
10	Molarity formula gives you 2.50 moles of this stuff. It's molar mass is 74 g/mole 2.50 moles x 74 grams/mole = 185 grams
11	Table H at 50°C slide finger up slowly, you touch ethanoic acid first, it has the lowest vapor pressure
12	LiF has molar mass of 26 grams per mole. 52 grams = 2 moles. 2 moles divided by 1.5 liters = 1.3 M
13	Skip
14	Hydrogen bonding is intermolecular, and is stronger than dipole and electron dispersion attraction
15	Back page of reference tables CONCENTRATION is molarity or PPM
16	H_2O is a 2:1 ratio which is a fixed proportion. A 3:1 or 2:5 or any other ratio is impossible
17	Just look at table F silver chloride is insoluble
18	Write PPM formula, put numbers where they belong. Solve for mass of solute.
19	Table G, go to 60°C and slide finger up slowly
20	Hotter temp = more soluble graph "goes UP" with higher temps

21	Table G, go to 80°C and slide finger up slowly to KCl
22	Solute dissolved into water increases the BP (BP elevation)
23	More ions in solution will conduct electricity better
24	Water FP is 273 K, salty water has a lower FP. Water has a higher FP, and a lower BP
25	Hottest temp = highest Kinetic Energy. Volume does not matter (it's the average)
26	$q = MC\Delta T$ do the math
27	40 g NaOH is one mole $NaOH \rightarrow Na^{+1}$ and OH^{-1} FP is depressed 2X 1.86 = 3.72 (not 5.72!!)
28	2 moles of glucose = 2 moles of polar molecules. 2 x 0.50K = 1.0 Kelvin higher, 374 Kelvin
29	Oil and water are immiscible, different polarities
30	Dynamic equilibrium forms
31	2.30 M means 2.30 moles per liter. This solution is only half a liter so only half the number of moles
32	$M_1V_1 = M_2V_2$ do the math
33	1.75 kg means 1750 grams. Write a formula and do the math
34	More water will lower the concentration of ions, making it conduct less well
35	Gases only get into solution under higher pressure and colder helps too
36	It feels colder and ΔH is positive (endothermic)
37	Molar mass and percent comp by mass shows this is 36% water by mass. 56.0 grams x 0.36 = 20.2 grams of water only
38	3 moles x 85 grams per mole = 255 grams, which goes into a flask, then finish with water to 1.00 liters
39	Silver chloride is insoluble on table F
40	126 grams will dissolve at 60°C only 80 grams fits at 10°C 46 grams precipitates out
41	$M_1V_1 = M_2V_2$ do the math

Part 2 coming on next page

A	At 65°C 120 grams could dissolve into this solution but there are only 90 grams dissolved. That means that 30 grams more could still fit in there.
	You are starting with 90 grams dissolved at 65°C. Then it cools to 15°C so only 27 grams stays in solution. The rest precipitates out. 90 – 27 = 63 grams precipitates out of solution
B	Heat energy flows from hand to test tube. Heat is energy and it can be transferred. "Cold" is not something, it's the lack of heat energy.
	Water is polar, the H side is positive and the oxygen side is negative. The "H" side of water molecules are attracted to the negative Cl^{-1} anions. The oxygen side of water IS NOT attracted to the anions. The anions are not diatomic.
C	Write the PPM formula and make sure you ONLY put grams into it. [0.00455 g divided by 1505 grams] X 1,000,000 = 3.02 PPM
D	Water has a higher FP. Water has a lower BP. Water has a FP of 273 K. $NH_{3(AQ)}$ has a lower FP. Solutes depress the freezing point of water. Water has a BP of 373 K. Salty water will have a higher BP. (BP elevation)