

Water and Temperature Changes

Remember:

$$[\text{H}_3\text{O}^+] = 1 \times 10^{-7} \text{ M}$$

$$\text{pH} = 7.0$$

$$[\text{OH}^-] = 1 \times 10^{-7} \text{ M}$$

$$\text{pOH} = 7.0$$

$$[\text{H}_3\text{O}^+][\text{OH}^-] = 1 \times 10^{-14}$$

$$\text{pH} + \text{pOH} = 14.0$$

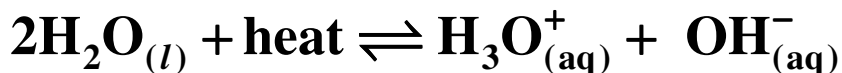
$$K_w = 1 \times 10^{-14}$$

$$\text{p}K_w = 14.0$$

Are ONLY true at 25°C

When the temperature is NOT 25°C

Use the ionization equation for water:



And draw and fill in what you need to for a particular question on the following table:

Temp	Shift	$[\text{H}_3\text{O}^+]$	$[\text{OH}^-]$	K_w	pH	pOH	$\text{p}K_w$
increase							
decrease							

Remember the main equations:

For pure water (water), it means its neutral, so

$$[\text{H}_3\text{O}^+] = [\text{OH}^-]$$

$$\text{pH} = \text{pOH}$$

$$[\text{H}_3\text{O}^+] = 10^{-\text{pH}}$$

$$[\text{OH}^-] = 10^{-\text{pOH}}$$

$$[\text{H}_3\text{O}^+][\text{OH}^-] = K_w$$

$$\text{pH} + \text{pOH} = \text{p}K_w$$