**Acids and Bases**

**pH value experiments**

**2 H2O H3O+ + OH-**

$$\frac{\left[H\_{3}O^{+}\right]x[OH^{-}]}{[H\_{2}O]^{2}}=constant$$

**[H3O+] [OH-] = const. = 10-14 (mol/l)2**

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**Doing the numbers – calculating the pH value**

Keep the solution with the dissolved Na.

What should be in the solution? What were the reactants?

Do you expect it to be acidic or basic?

What should be the pH value?

Well, each Na atom upon reaction with water created one [OH]- ion.

If we reacted 1 mm3 of Na, having a density of approximately 1g/cm3 we had how many grams of Na?

With 23g Na being one mol, thus we had how many moles of Na, equaling the mols [OH]- created?

pH value expected:

Take a measurement

pH value measured:

Now add another 1 mm3 of Na.

Which new pH value do you expect? Big change?

Take a measurement. Big change?

**Neutralization / Titration**

Now carefully add some vinegar, frequently stirring, and watch the pH go down.

You neutralize the NaOH base.

Continue till you reach approximately pH4, thus making the solution acidic.

Now we approximately have as many excess H3O+ ions as we had OH- ions before, right?

So adding one more bit of 1 mm3 Na should neutralize this bringing the pH back to neutral pH7, right?

Try it and think of an explanation of what you observe.

Think biology – this effect plays a large role in living things.