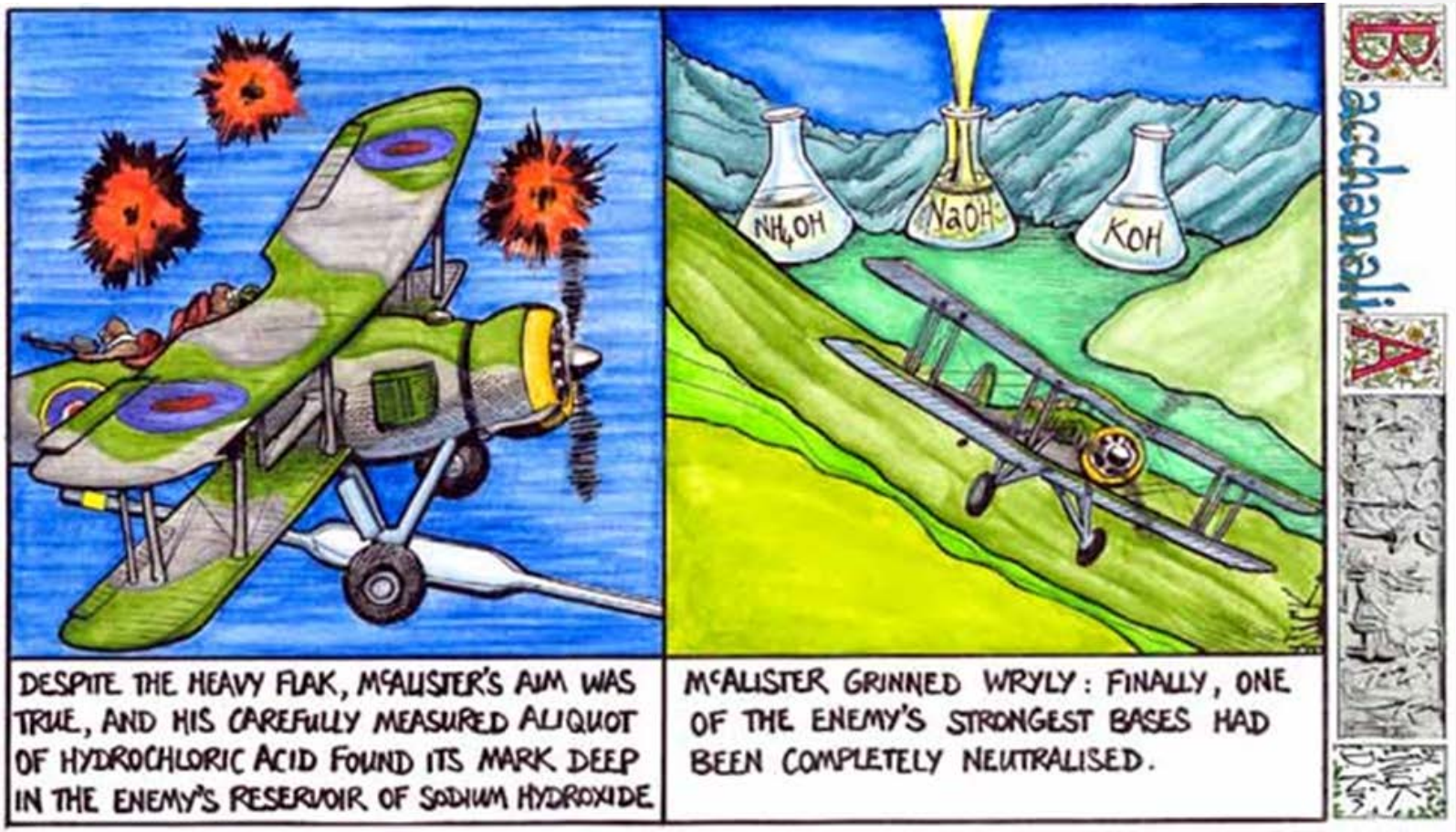
Neutralization



Outcome:

S2-2-10 Explain how acids and bases interact to form a salt and water in the process of neutralization.

Neutralization Reactions:

- Recall that acids and bases are opposites, thus they will "**CANCEL EACH OTHER OUT**" when mixed together.

  →This process is called **NEUTRALIZATION**.

- Neutralization is a **DOUBLE REPLACEMENT** reaction, between an **ACID** and a **BASE**, that **PRODUCES WATER AND A SALT.**

Examples:

$$HCl + NaOH \rightarrow NaCl + H_2O$$

Acid Base Salt water

$$HCl + KOH \rightarrow KCl + H_2O$$

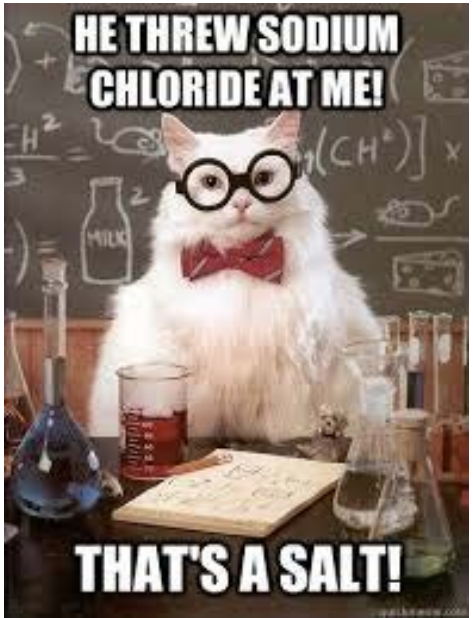
Acid Base Salt Water

Salts???

- Notice that the salt in the second example is **NOT** NaCl (**TABLE** salt)
- A **SALT**, in chemistry, is any **IONIC COMPOUND** consisting of a **POSITIVE ION** other than hydrogen, and a **NEGATIVE ION** other than hydroxide. (OH^-)

  E.g. KF, LiBr, and NaCl are all salts)

In other words, NaCl is just one example of a "**SALT**"



Back to neutralization…

In this example:

$$HCl + KOH \rightarrow KCl + H_2O$$

- The **ACID PROVIDES** the **NONMETAL** chloride and the **BASE PROVIDES** the **METAL** lithium in the formation of the **SALT** LiCl (lithium chloride).

- It is also characteristic of a neutralization reaction to use the **HYDROGEN** (H+) from the acid and the **HYDROXIDE** (OH-) from the base to form **WATER**.

- Neutralization refers to the fact that the acid and the base **NO** longer exist in the **PRODUCTS**, and **WATER** (which is neutral pH = 7) is **PRODUCED**.

Neutralization Examples…

$Mg^{2+}\ OH^-$ $Mg^{2+}\ Cl^-$

1. Balance the reaction between the acid HCl and the base $Mg(OH)_2$.

$$2HCl + Mg(OH)_2 \longrightarrow MgCl_2 + 2H_2O$$

$Al^{3+}\ Br^-$

2. Balance the reaction between the acid HBr and the base $Al(OH)_3$.

$$3HBr + Al(OH)_3 \longrightarrow AlBr_3 + 3H_2O$$

Try this one…

$Fe^{2+}\ I^-$

Balance the reaction between the acid HI and the base $Fe(OH)_2$

$$2HI + Fe(OH)_2 \longrightarrow FeI_2 + 2H_2O$$