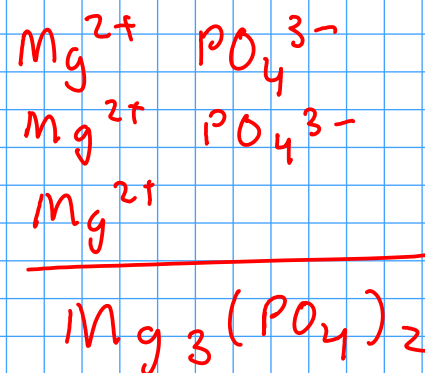
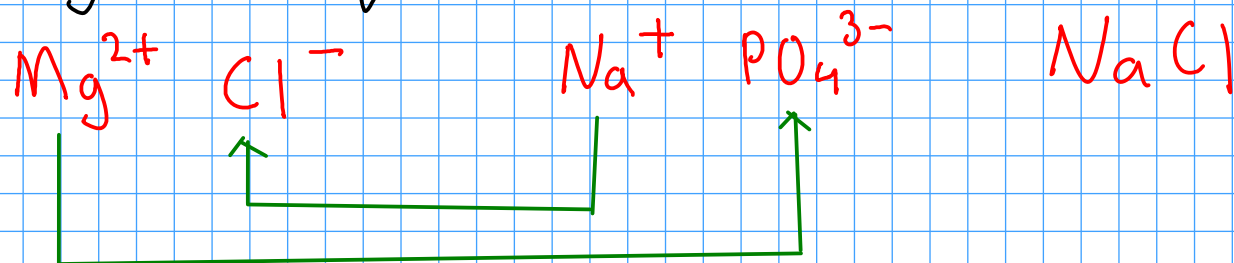
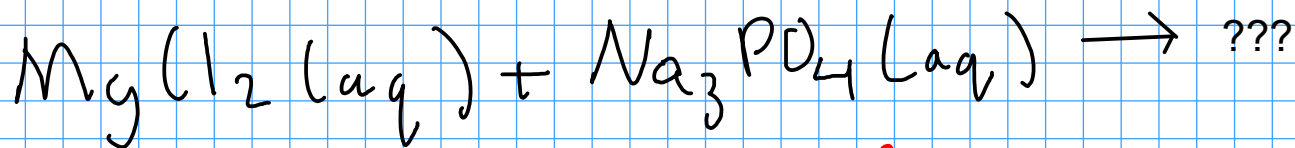


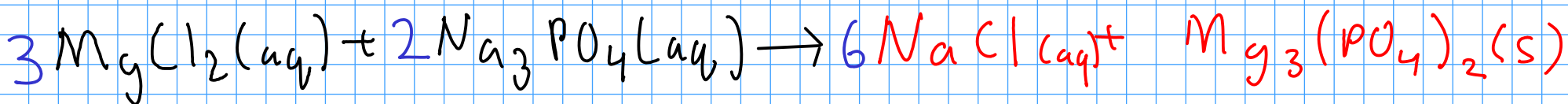
PRECIPITATION

- Form an insoluble ionic compound

Experiment 10 in your laboratory involves
EXCHANGE REACTIONS



Remember, IONS exchange partners. That means that you need to write out the IONS, including their charges, and pair them up. The formulas of the products are controlled by the CHARGES of the IONS in the new compounds!

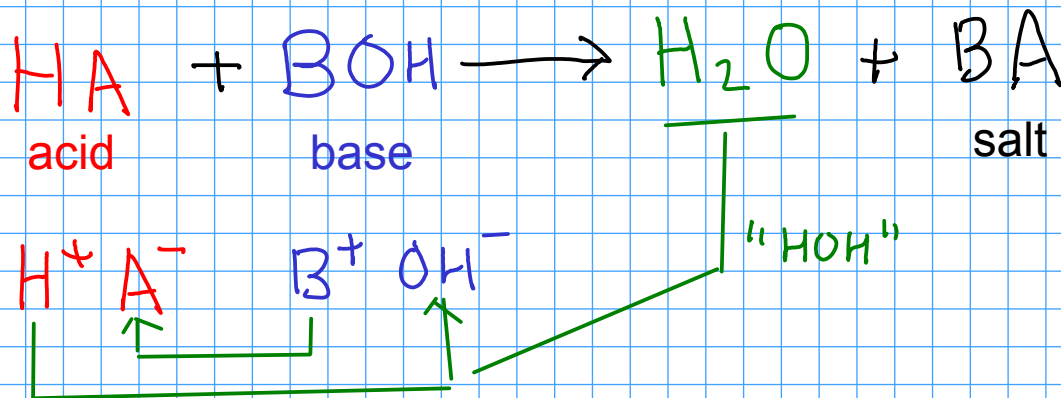


- Does a solid (insoluble) ionic compound form? Check DATA (p 170 in book)

* When writing exchange reactions, figure out the formulas of the products FIRST, and THEN balance the equation.

FORMATION OF STABLE MOLECULES

- There are several stable molecules that may be formed in double replacement reactions, but the most common is WATER!
- Double replacement reactions that form water are also called "neutralizations"



* To make water (H_2O), you need a source of hydrogen ion (H^+) and hydroxide ion (OH^-)

ACIDS

- compounds that release hydrogen ion (H^+), when dissolved in water.

Properties of acids:

- Corrosive: React with most metals to give off hydrogen gas
- Cause chemical burns on contact
- Taste sour (like citrus - citric acid!)
- Changes litmus indicator to RED

BASES

- Substances that release hydroxide ion (OH^-) when dissolved in water

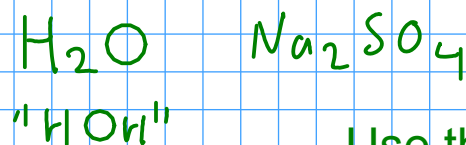
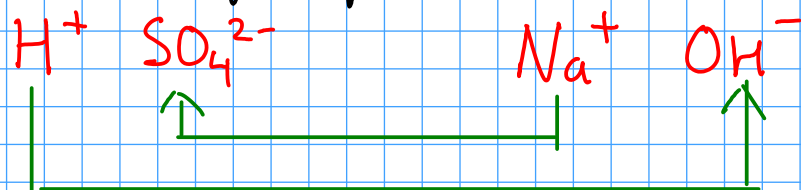
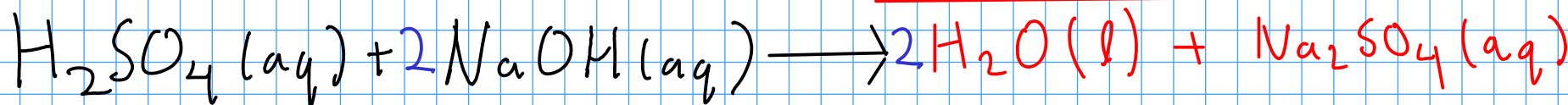
Properties of bases:

- Caustic: Attack and dissolve organic matter (think lye, which is NaOH)
- Cause skin/eye damage on contact
- Taste bitter
- changes litmus indicator to BLUE

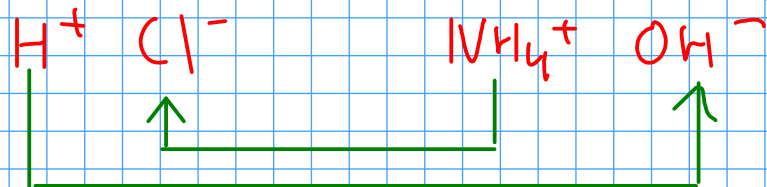
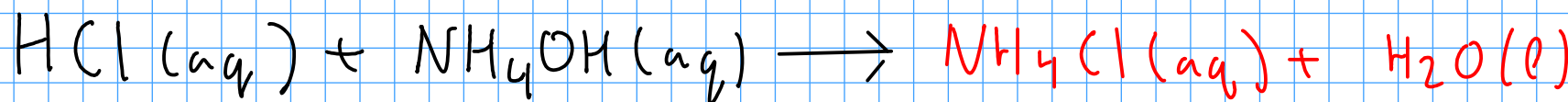
Due to the dissolving action of base on your skin, bases will feel "slippery". The base ITSELF is not particularly slippery, but what's left of your skin IS!

Examples of acid-base chemistry:

When a neutralization reaction occurs, energy is released. There will be a temperature increase!



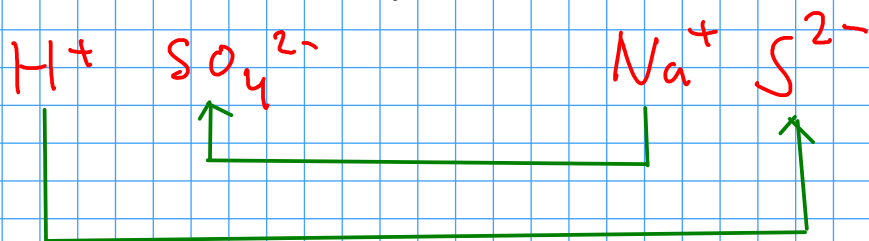
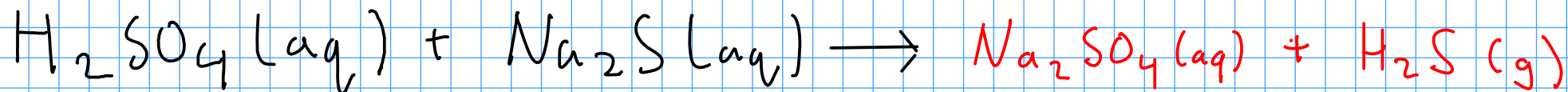
Use the SOLUBILITY CHART on p170 of your textbook to predict whether these substances dissolve!



DOUBLE REPLACEMENTS THAT FORM GASES

① Formation of hydrogen sulfide: H_2S

- need an ACID (source of hydrogen ion) and a SULFIDE

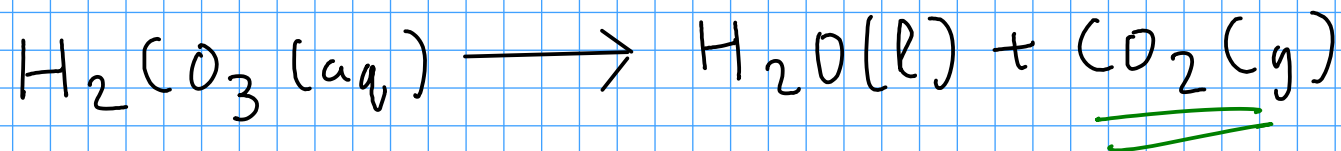


Gas with rotten-egg odor!

Observation: Odor and visible gas bubbles

② Formation of carbonic acid and carbon dioxide:

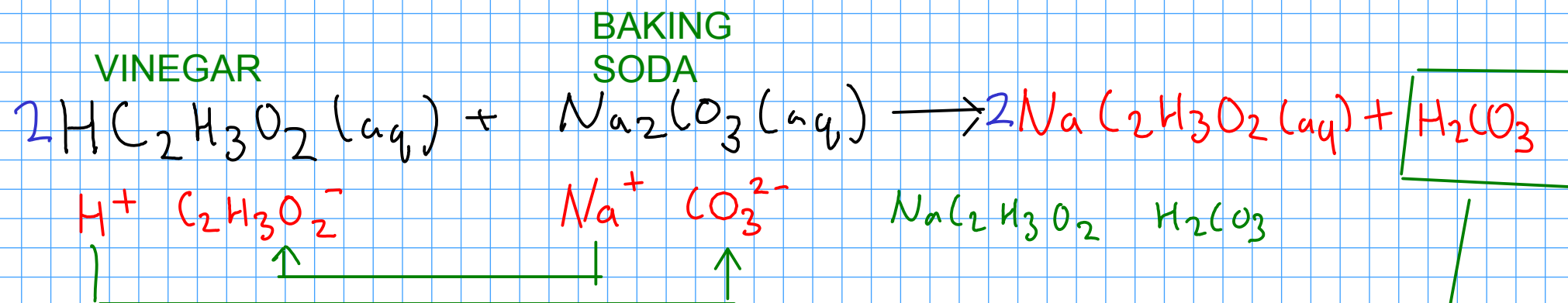
- Carbonic acid DECOMPOSES when formed in double replacement reactions!



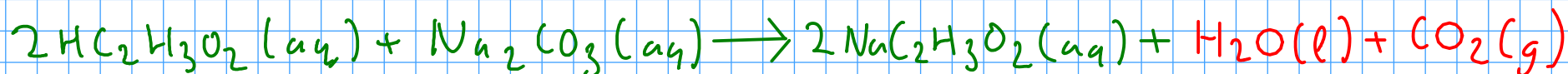
- to form carbonic acid by double replacement, you need a source of hydrogen ion (ACID) and a source of carbonate (can be CARBONATE or BICARBONATE)



Example of a reactions that forms carbonic acid, then gas: The "baking soda volcano"!

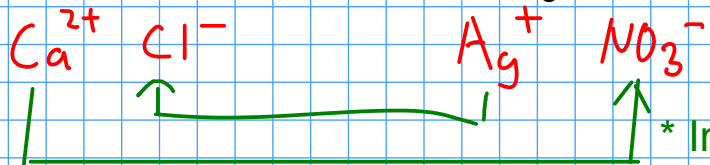
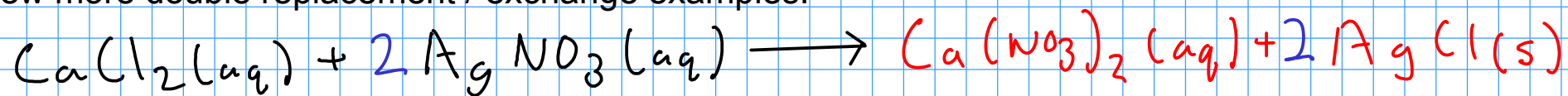


... but carbonic acid decomposes,
and we get GAS BUBBLES



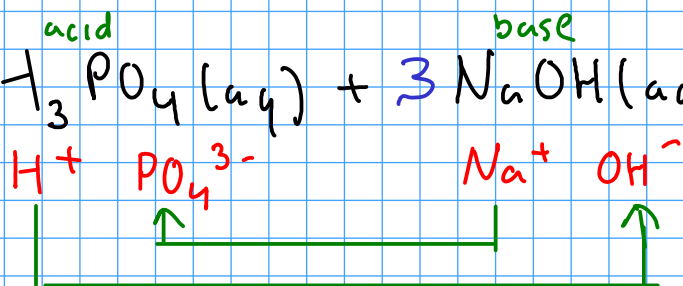
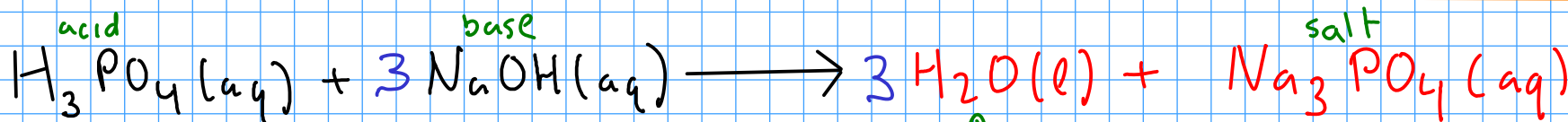
This is the overall process. We show carbon dioxide and water as products, since we want to show the reaction as it's actually observed -with carbonic acid broken down to water and (gaseous) carbon dioxide.

A few more double replacement / exchange examples:

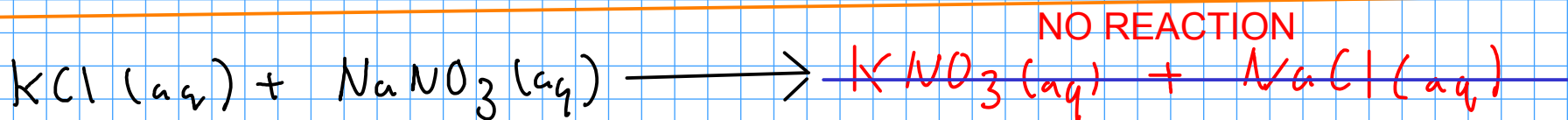


PRECIPITATION of silver(I) chloride drives this reaction!

* In double replacement reactions, transition metals DO NOT change their charge!



NEUTRALIZATION: Water forms as a product



NO REACTION

NO REACTION occurs! There is no driving force.
(1) No solid forms, (2) no stable molecules form (no water), (3) no gas forms. So we don't observe anything!

