Indigestion Remedies

Compare two unknown indigestion remedies to determine which is more effective in neutralising "stomach acid".

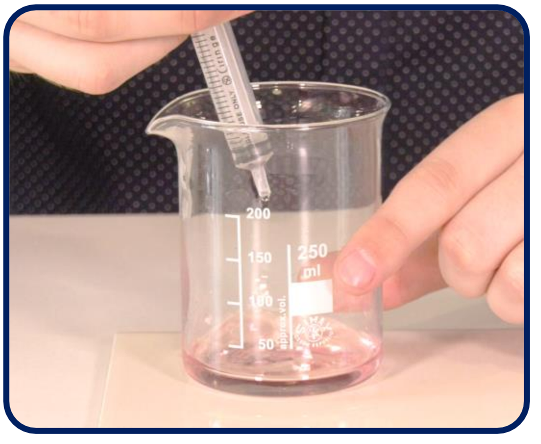
Method

1. Place 10ml of hydrochloric acid in a beaker and add a few drops of universal indicator solution (t should turn red). Place the beaker on a white tile so that the colour can be seen clearly.
2. Fill a syringe with remedy A. Slowly add this to the beaker. While adding, gently swirl the beaker to ensure the two solutions are mixed. Continue slowly adding the solution until the indicator so a neutral solution (green).
3. Record the amount of remedy that was added to the solution to neutralise it.
4. Repeat this process for remedy B.

Equipment

- "stomach acid" (0.2M hydrochloric acid)
- Remedy A
- Remedy B
- Graduated pipettes / syringes
- 250ml beaker
- White tile
- Universal indicator solution

Remedy	Volume added to neutralise (ml)	
	Trial 1	Trail 2
A		
B		



Questions

1. Which remedy is more effective at neutralising stomach acid? Explain your answer.

2. Calcium carbonate tablets are normally used as an indigestion remedy. This reactions produces calcium chloride, water and carbon dioxide. Write a word equation for this reaction.

3. Suggest why calcium carbonate may be a better than an alkali to neutralise excess stomach acid.

Balancing Chemical Equations

Balance the equations below:

1. ___ HCl + ___ $NaOH$ → ___ $NaCl$ + ___ H_2O
2. ___ H_2SO_4 + ___ KOH → ___ K_2SO_4 + ___ H_2O
3. ___ HNO_3 + ___ NH_3 → ___ NH_4NO_3 + ___ H_2O
4. ___ H_3PO_4 + ___ $Ca(OH)_2$ → ___ $Ca_3(PO_4)_2$ + ___ H_2O
5. ___ HCl + ___ NH_4OH → ___ NH_4Cl + ___ H_2O
6. ___ H_2SO_4 + ___ $Mg(OH)_2$ → ___ $MgSO_4$ + ___ H_2O
7. ___ HNO_3 + ___ $LiOH$ → ___ $LiNO_3$ + ___ H_2O
8. ___ H_3PO_4 + ___ $Al(OH)_3$ → ___ $AlPO_4$ + ___ H_2O
9. ___ CH_3COOH + ___ KOH → ___ $K(CH_3COO)$ + ___ H_2O
10. ___ $C_3H_5O(COOH)_3$ + ___ $Ca(OH)_2$ → ___ $Ca(C_3H_5O(COO)_3)_2$ + ___ H_2O

If something is in brackets, everything in the bracket is multiplied by the small number. E.g. $Na(OH)_2$ has 1 sodium atom (Na), 2 oxygen (O) atoms and 2 hydrogen (H) atoms.

Acids	Alkalis
HCl – Hydrochloric acid H_2SO_4 – sulphuric acid HNO_3 – nitric acid H_3PO_4 – phosphoric acid CH_3OOH – ethanoic acid (vinegar) $C_3H_5O(COOH)_3$ - citric acid	$LiOH$ – lithium hydroxide $NaOH$ – Sodium hydroxide KOH – potassium hydroxide NH_3 – ammonia NH_4OH – ammonium hydroxide $Ca(OH)_2$ – calcium hydroxide $Mg(OH)_2$ – magnesium hydroxide $Al(OH)_3$ – aluminium hydroxide

Balancing Chemical Equations - Top Tip #1	
The elements are either written as a single upper-case letter or an upper-case letter followed by a lower-case letter.	
C – carbon Na – sodium	
Top Tip #2	**Top Tip #3**
Two upper case letters next to each other indicate that there are two different elements present.	The subscript number after an element tells us how many atoms of that element are in the molecule. If there is no number, then there is just one atom of that element
Co – cobalt CO – carbon & oxygen (carbon monoxide)	P_2O_5 Here there are 2 phosphorus atoms and 5 oxygen atoms in 1 molecule.
Top Tip #4	**Top Tip #5**
The large number in front shows how many molecules we have in total. If there is no number, then there is just one molecule.	The objective of balancing equations is to have the same number of atoms either side of the arrow.
$2H_2O$ 2 molecules of water (H_2O). Which is 4 hydrogen (H) and 2 Oxygen (O) atoms in total.	$2Na + Cl_2 \rightarrow 2NaCl$ On the left there are 2 sodium (Na) and 2 chlorine (Cl) atoms. On the right there are 2 sodium (Na) and 2 chlorine (Cl) atoms.
The GOLDEN rule	
When we balance equations, we **only** change the number in front, **never** the small number as this changes the chemical.	
To balance the equation $H_2 + O_2 \rightarrow H_2O$ Only add numbers in front $2H_2 + O_2 \rightarrow 2H_2O$ Do not change or add subscript numbers $H_2 + O_2 \rightarrow H_2O_2$* *Here water was changed into corrosive hydrogen peroxide!	

Why do scientist use chemical equations?
What law of chemistry does a balanced equation demonstrate?

Balancing Chemical Equations

1. $HCl + NaOH \rightarrow NaCl + H_2O$
2. $H_2SO_4 + 2KOH \rightarrow K_2SO_4 + 2H_2O$
3. $HNO_3 + NH_3 \rightarrow NH_4NO_3 + H_2O$
4. $2H_3PO_4 + 3Ca(OH)_2 \rightarrow Ca_3(PO_4)_2 + 6H_2O$
5. $HCl + NH_4OH \rightarrow NH_4Cl + H_2O$
6. $H_2SO_4 + Mg(OH)_2 \rightarrow MgSO_4 + H_2O$
7. $HNO_3 + LiOH \rightarrow LiNO_3 + H_2O$
8. $H_3PO_4 + Al(OH)_3 \rightarrow AlPO_4 + 3H_2O$
9. $CH_3COOH + KOH \rightarrow K(CH_3COO) + H_2O$
10. $2C_3H_5O(COOH)_3 + 3Ca(OH)_2 \rightarrow Ca_3(C_3H_5O(COO)_3)_2 + 3H_2O$