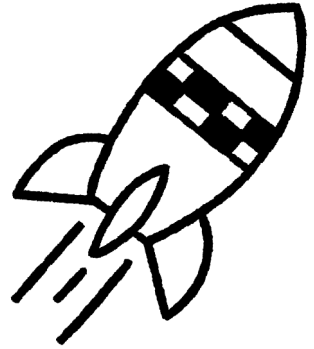


# Falgal kiimiko: dhexdhexaadin (neutralisation)

**Sayniska**

Cutub: Aashito iyo sal (bases)



## Natiijo

Waxaan qeexi karaa waxa dhaca inta lagu jiro falgal dhexdhexaadin (neutralisation reaction) waxaana qori karaa isla'egyo erayo iyo calaamad ah oo matalaya falgal dhexdhexaadin oo kala duwan.

## Erayada muhiimka ah

### **dhexdhexaadin (neutralisation)**

Marka falgal kiimiko (chemical reaction) u dhaxeeyo aashito iyo sal (base) si loo soo saaro milan dhexdhexaad (neutral solution) (pH 7) oo ah cusbo bir ah (metal salt) iyo biyo (water).

### **cusbo bir (metal salt)**

Xarun (compound) la sameeyo marka aashito la falgasho sal (base).

### **milan aqueous (aqueous solution) (aq)**

Waxa la sameeyaa marka walax lagu milo biyo (water).

Falgal kiimiko: dhexdhexaadin (neutralisation)

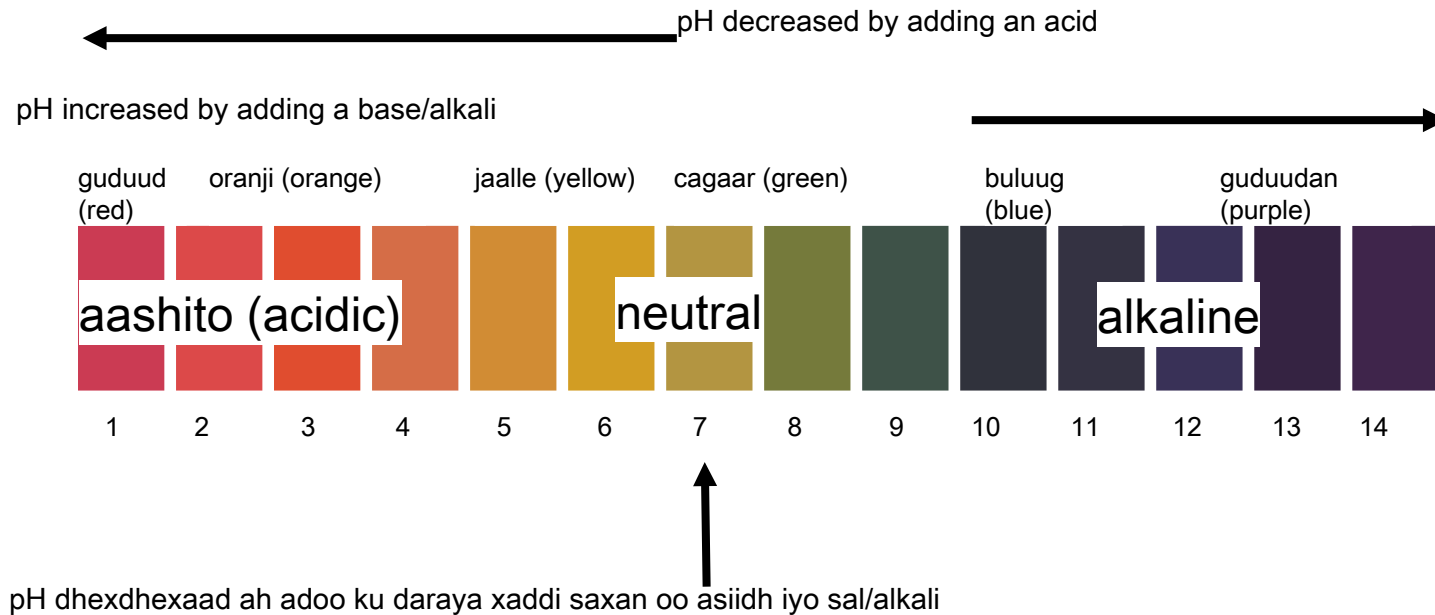


Dhexdhexaadin (Neutralisation)



Isla'egyada dhexdhexaadinta (Neutralisation equations)

pH-ga milan (solution) waa la kordhin karaa ama yarayn karaa marka lagu daro aashito ama sal/alkali. Waxaa lagu arki karaa iyadoo lagu daro indicator.



## Run mise been?

When acids and bases/alkalis are mixed in the correct quantities a neutral solution is made.



Run



Been

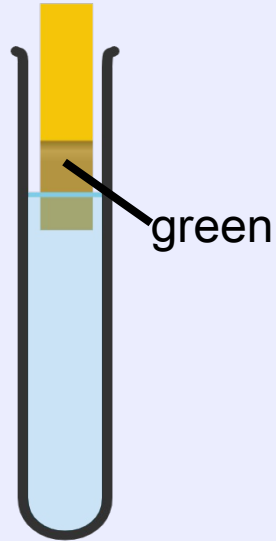
## Sabab u sheeg jawaabtaada

- a** Acids and bases/alkalis in correct quantities will react to form a neutral pH 7 solution.
- b** Acids and bases/alkalis in correct quantities will react to form a neutral pH 1 solution.

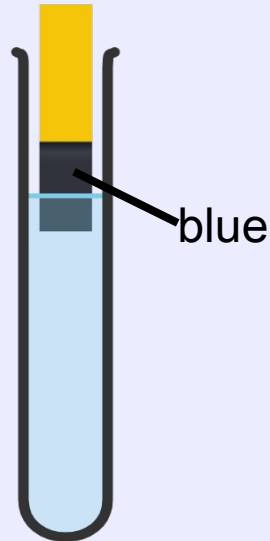


# Neutralisation

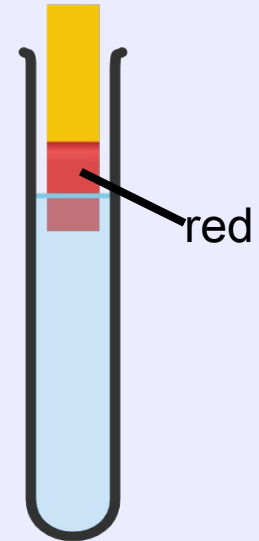
Which test tube contains a neutral solution?



**a** ✓



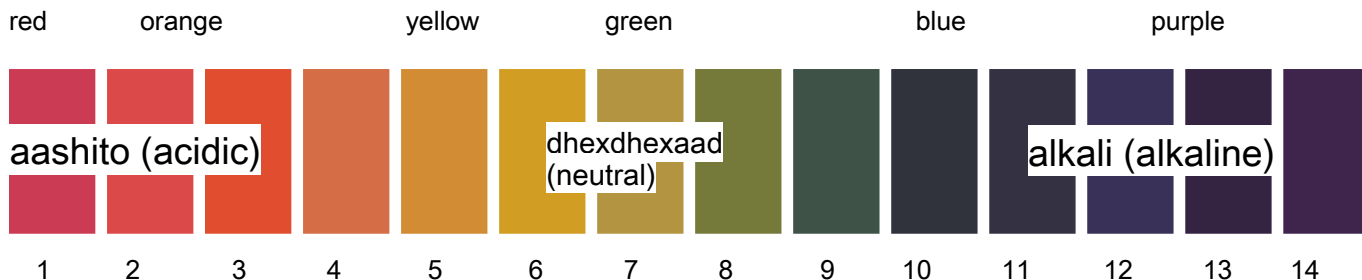
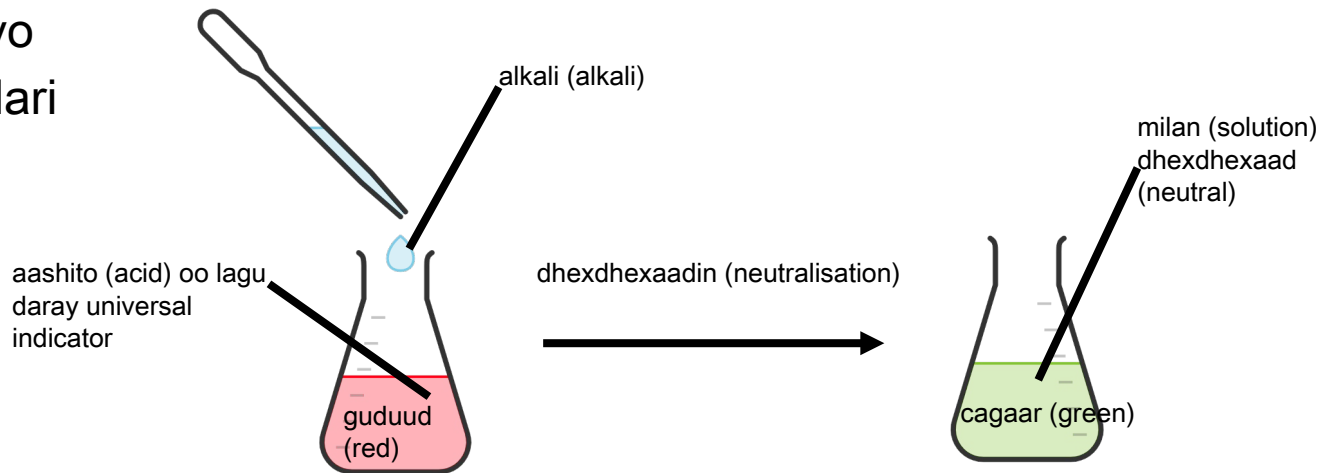
**b**



**c**

Si loo dhexdhexaadiyo  
asiidh, alkali waa la dari  
karaa.

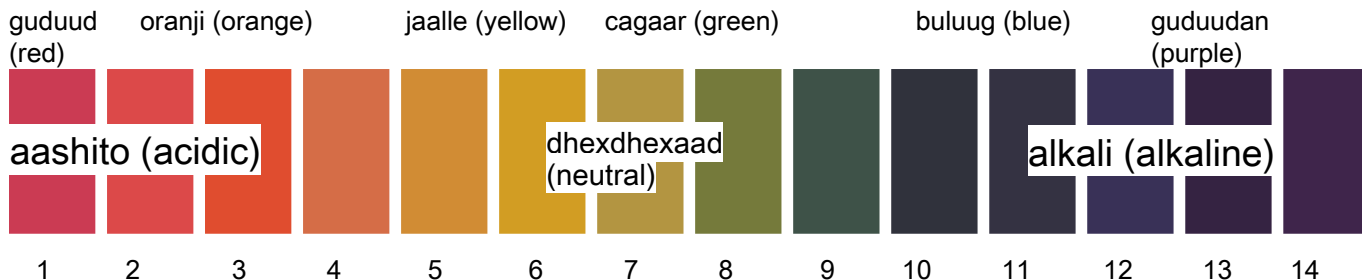
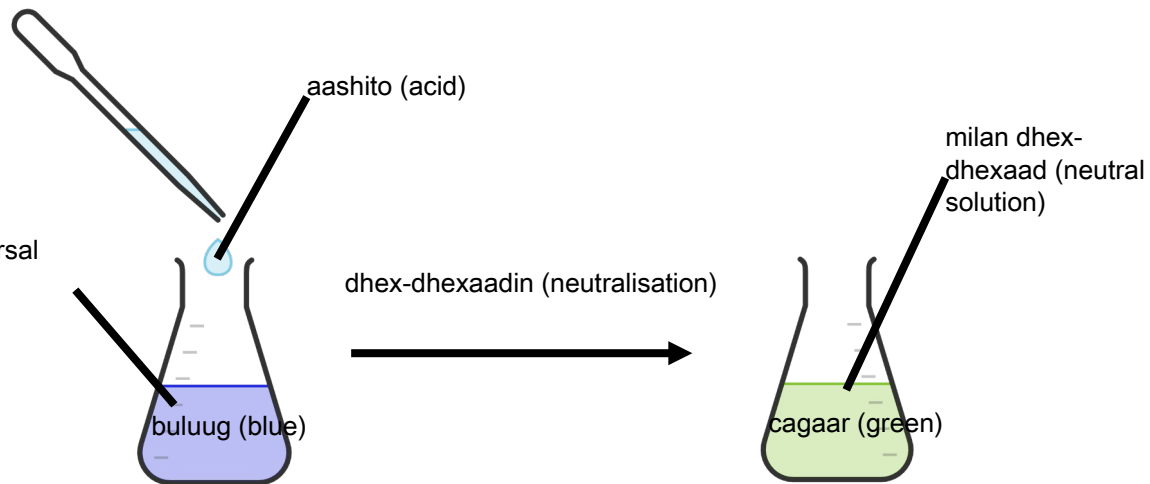
pH-ga milanka  
(solution) ayaa  
kordhay.



Si loo dhexdhexaadiyo alkali (alkali) waxaa lagu dari karaa aashito (acid).

alkali (alkali) oo lagu daray universal indicator (universal indicator)

pH-ga milanka (solution) ayaa hoos u dhacay.



Maxaa loo baahan yahay in lagu daro milankan si loo dhex-dhexaadiyo (neutralise)?

**a**

aashito (acid)

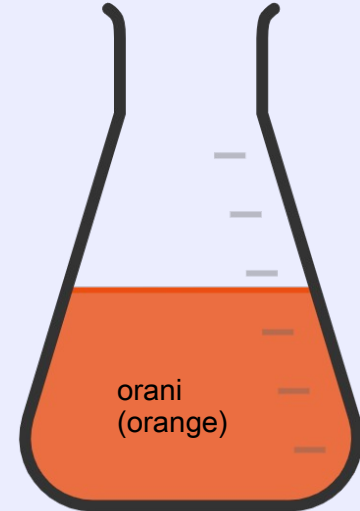
**b**

alkali (alkali)



**c**

milan dhex-dhexaad (neutral solution)



Maxaa ku dhici doona pH-ga milankan marka la dhex-dhexaadiyo (neutralised)?

**a**

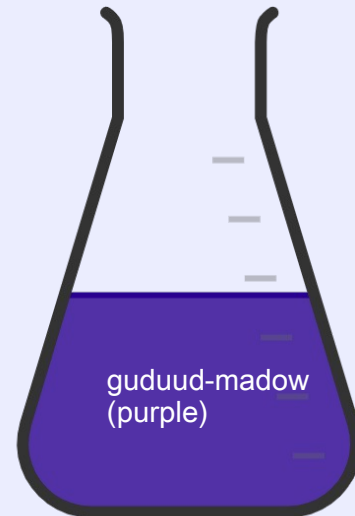
kordhinta pH 7

**b**

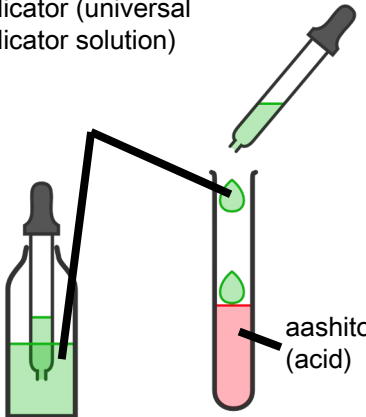
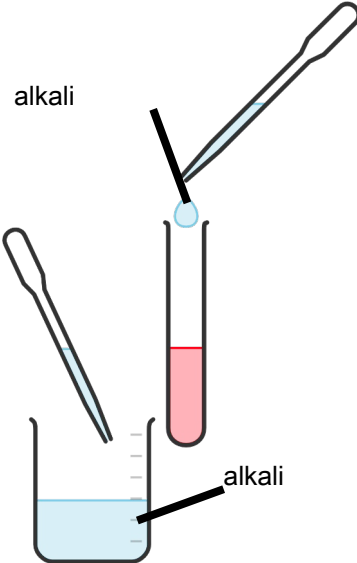
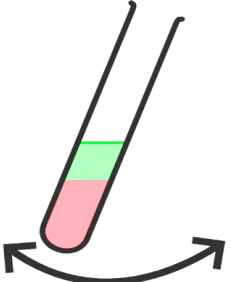
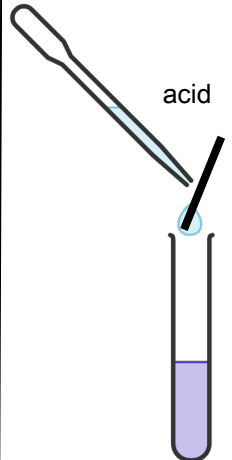
hoos u dhaca pH 7

**c**

kordhinta pH 12



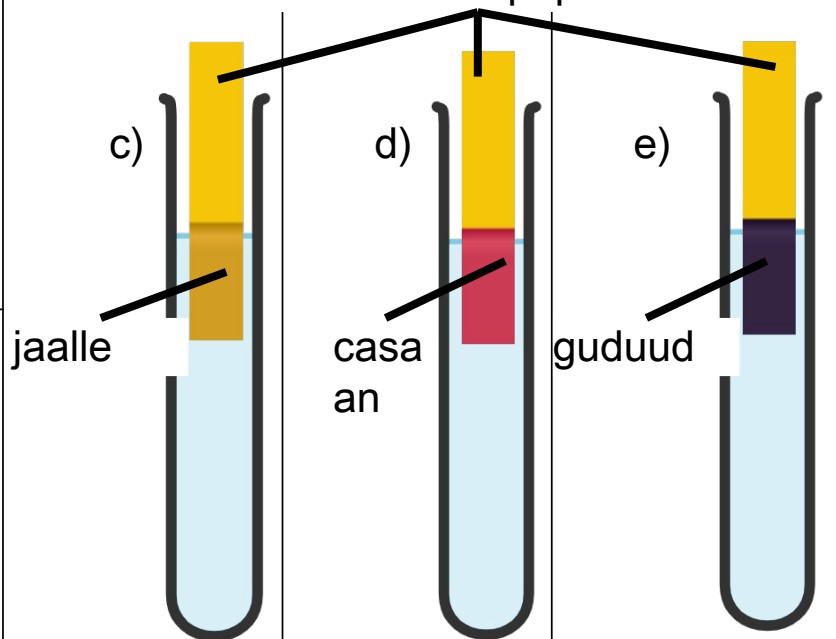
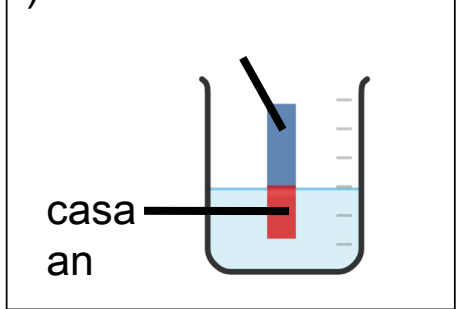
1) Waxaa la siin doonaa aashito (acid) waxaadna isticmaali doontaa alkali (alkali) si aad u dhex-dhexaadiso (neutralise).

|                                                                                                                                                                                                                                                                                          |                                                                                                                                                                          |                                                                                                                                                                                  |                                                                                                                                                                                                                  |                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>milan universal indicator (universal indicator solution)</p>  <p>aashito (acid)</p> <p>Tallaabada 1: ku dar 2-3 dhibco oo ah universal indicator solution (milan (solution) indhaha) ee acid-ka.</p> | <p>Tallaabada 2: ku dar 1 dhibic oo alkali ah acid-ka.</p>  <p>alkali</p> <p>alkali</p> |  <p>Tallaabada 3: isku gas milan (solution) adigoo ruxaya test tube-ka dhinac ilaa dhinac.</p> |  <p>Tallaabada 4: ku celi tallaabooyinka 2 iyo 3 ilaa aad gaadho pH 7, oo ah milan (solution) cagaaran oo dhexdhexaad ah.</p> |  <p>acid</p> <p>Fiiro: ku dar dhibco acid ah haddii milan (solution)-kaagu noqdo alkaline.</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

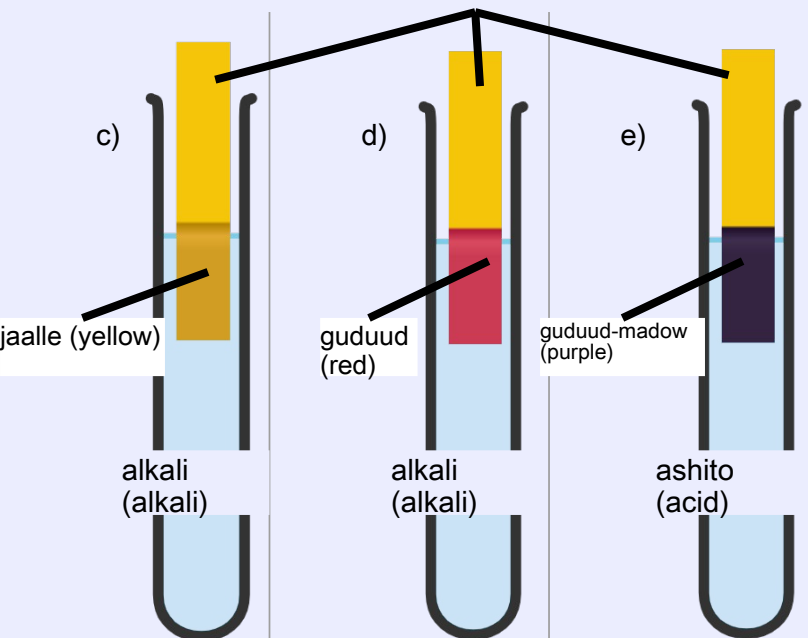
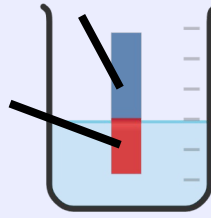
Hambalyo haddii aad gaadhsiiyay milan (solution) cagaaran oo dhexdhexaad ah; waxaad samaysay milan (solution) cusbo (salt) milmi kara iyo biyo (water).



2) Maxaad ku dari lahayd milan (solution)-ka si aad u dhexdhexaaddo? Dooro acid ama alkali.

|                                                                           |                                                                                                                                                                         |  |  |                                                                                                                               |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|-------------------------------------------------------------------------------------------------------------------------------|
| <p>a) Milan (solution) casaan ah marka universal indicator lagu daro.</p> | <p>universal indicator paper</p>  <p>c) jaalle</p> <p>d) casaan</p> <p>e) guduud</p> |  |  | <p>f) blue litmus paper</p>  <p>casaan</p> |
| <p>b) Milan (solution) ka beddela universal indicator paper buluug.</p>   |                                                                                                                                                                         |  |  | <p>g)</p> <p>Milan (solution) kaas oo red litmus paper u beddela buluug marka lagu daro.</p>                                  |

2) Maxaad ku dari lahayd milan (solution)-ka si aad u dhexdhexaaddo? Dooro acid ama alkali.

|                                                                                                               |                                                                                                                                                                                                                                                                                         |  |  |                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>a) Milan (solution) midabkiisu guduud (red) yahay marka tilmaame guud (universal indicator) lagu daro.</p> | <p>warqad tilmaame guud (universal indicator paper)</p> <div>  <p>c) jaalle (yellow) alkali (alkali)</p> <p>d) guduud (red) alkali (alkali)</p> <p>e) guduud-madow (purple) ashito (acid)</p> </div> |  |  | <p>f) warqad litmus buluug (blue litmus paper)</p> <div>  <p>guduud (red)</p> <p>alkali (alkali)</p> </div> |
| <p>b) Milan (solution) ka beddela warqadda tilmaame guud (universal indicator paper) buluug (blue).</p>       |                                                                                                                                                                                                                                                                                         |  |  | <p>g) ashito (acid)</p> <p>Milan (solution) kaas oo warqad litmus guduud (red litmus paper) u beddesha buluug (blue) marka lagu daro.</p>                                                      |

Falgal kiimiko: dhexdhexaadin (Chemical reactions: neutralisation)



Dhexdhexaadin (Neutralisation)



Isle'egyada dhexdhexaadinta (Neutralisation equations)

Isle'egyada kiimikada waxaad ku kartaa:

- aqoonso xaaladda walax kasta
- isticmaal markaad qorayso isla'eg eray ama calaamad

Sida loo qoro xaaladaha walabka:

Waa inay:

- loo qoro xarfo yaryar
- loo qoro hoos (subscript)
- ku dar qaws (brackets)

tusaale: carbon dioxide gaas waxaa loo qori doonaa

- carbon dioxide(g)
- CO<sub>2</sub> (g)

tusaale: sodium hydroxide adag (NaOH) waxaa loo qori doonaa

- sodium hydroxide (s)
- NaOH (s)

tusaale: sodium hydroxide (NaOH) milan (solution) waxaa loo qori doonaa

- sodium hydroxide (aq)
- NaOH (aq)

Waa sidee habka saxda ah ee loo isticmaalo astaanta gobolka ee milan (solution) copper sulfata? Doorro jawaabta saxda ah.

**a**

copper sulfata (AQ)

**b**

copper sulfata (aq)

**c**

copper sulfata (aq)

**d**

copper sulfata aq



## Run mise been?

Habka saxda ah ee loo qoro astaanta gobolka ee sodium chloride adag (NaCl) waa NaCl (aq).



Run



Been



## Sabab u sheeg jawaabtaada

**a**

Astaanta gobolka ee adag waa (s), waa inay noqotaa xarfo yaryar, gudaha qawska, iyo subscript.



**b**

Astaanta gobolka ee adag waa (S), waa inay noqotaa xarfo waaweyn, gudaha qawska, iyo superscript.

Marka ay dhacdo falgal (reaction) neutralisation, isla'egta guud waa:

acid + base  $\rightarrow$  metal salt + biyo (water)

Tusaale: neutralisation ee hydrochloric acid iyo sodium hydroxide milan (solution) waa:

hydrochloric acid + sodium hydroxide  $\rightarrow$  sodium chloride + biyo (water)

**Jawaabaha:**

Waa maxay isla'egta guud ee falgalka (reaction) u dhexeeya asiidh iyo sal (base) si loo soo saaro cusbo (salt) macdan ah iyo biyo (water)?

**a** asiidh + sal (base) → milan (solution) + biyo (water)

**b** asiidh + sal (base) → cusbo (salt) macdan + hydrogen

**c** asiidh + sal (base) → cusbo (salt) macdan ✓ + biyo (water)

Oxides iyo hydroxides macdan ee caadiga ah waa sal (base).

Sodium hydroxide, calcium oxide iyo copper oxide waa sal (base) caadi ah oo neutralise gareyn doona asiidh.



Waa maxay walax noqon karta sal (base)?

**a**

carbon dioxide

**b**

magnesium oxide

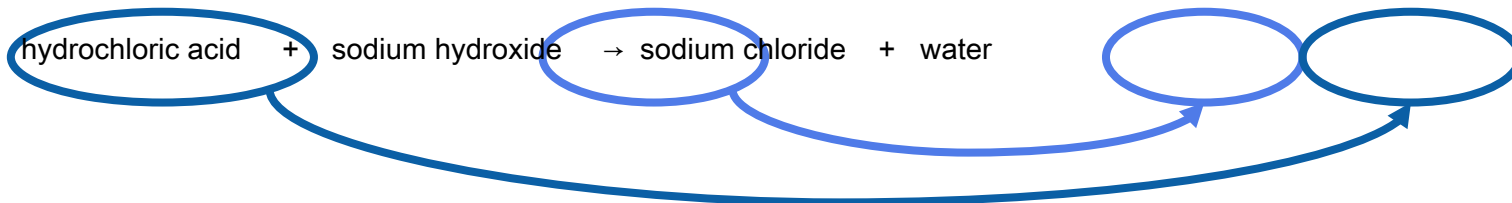


**c**

copper sulphate

Falgal (reaction) neutralisation, cusbada (salt) la sameeyay waxaa loo magacaabaa macdanta (sal-ka) iyo asiidhka la isticmaalay.

| magaca asiidhka | magaca dhammaadka cusbada (salt) macdanta |
|-----------------|-------------------------------------------|
| hydrochloric    | chloride                                  |
| sulfuric        | sulfate                                   |
| nitric          | nitrate                                   |



# Neutralisation equations

Waa kee cusbada birta ee laga samayn karo falgalka dhexdhexaadinta ee magnesium oxide iyo sulfuric acid?

**a** magnesium sulfuric

**b** iron sulfate

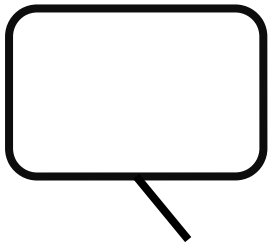
**c** magnesium nitrate

**d** magnesium sulfate

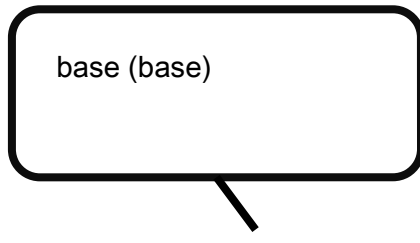


# Neutralisation equations

Sida loo qoro astaamaha xaaladda ee isla'egta erayada falgalka dhexdhexaadinta.



always a  
solution in the  
school  
laboratory

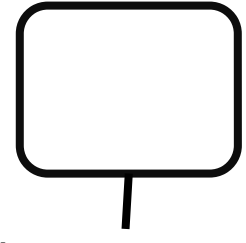


wuxuu noqon karaa  
adag ama milan -  
macluumaad dheeri  
ah ayaa loo baahan  
yahay

→



wuxuu noqon karaa  
adag ama milan -  
macluumaad dheeri  
ah ayaa loo baahan  
yahay



always a  
liquid at room  
temperature

# Isla'egta neutralisation (Neutralisation equations)

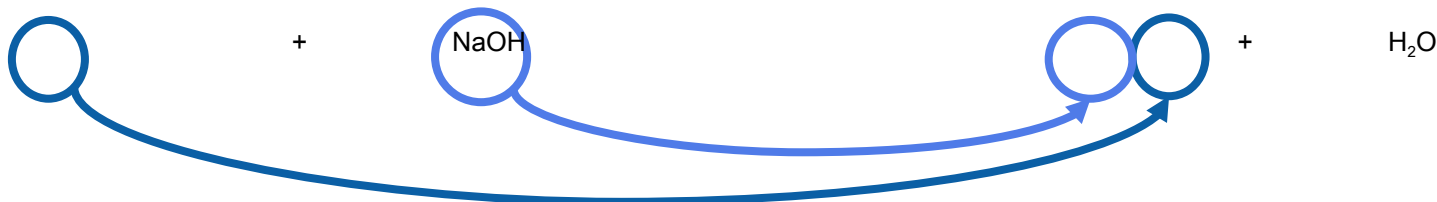
Dhamaystir jumlada. Acids-ka loo isticmaalo shaybaarka dugsiga waa...

- a** had iyo jeer ku jira milan (solution) oo leh astaanta gobolka (aq). ✓
- b** had iyo jeer ku jira milan (solution) oo leh astaanta gobolka (l).
- c** had iyo jeer waa dareere oo leh astaanta gobolka (l).
- d** had iyo jeer waa adke oo leh astaanta gobolka (s).

Falgal neutralisation (reaction), cusbada birta (metal salt) ee la sameeyo waxaa loo magacaabaa birta (laga soo qaaday base) iyo acid-ka la isticmaalay.

| magaca acid-ka      | qaacidada kiimikada ee acid-ka | dhammaadka magaca cusbada birta (metal salt) | qaacidada kiimikada ee dhammaadka cusbada birta (metal salt) |
|---------------------|--------------------------------|----------------------------------------------|--------------------------------------------------------------|
| hydrochloric        | HCl                            | kloraydh (chloride)                          | Cl                                                           |
| sulfurik (sulfuric) | H <sub>2</sub> SO <sub>4</sub> | sulfate (sulfate)                            | SO <sub>4</sub>                                              |
| nitrik (nitric)     | HNO <sub>3</sub>               | nitrate (nitrate)                            | NO <sub>3</sub>                                              |

hydrochloric acid + sodium hydroxide → sodium chloride + biyo (water)



## Isleegyada dhexdhexaadinta (Neutralisation equations)

Waa maxay qaacidada (formula) cusbada (salt) birta laga sameeyay falgalka (reaction) dhexdhexaadinta (neutralisation) ee u dhexeeya zinc oxide (ZnO) iyo sulfuric acid (H<sub>2</sub>SO<sub>4</sub>)?



**a**

**b**

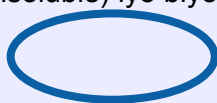


**c**

Qor calaamadaha xaaladda (state symbols) ee isleegga calaamadda (symbol equation) lagu sharraxay erayo: Falgalka dhexdhexaadinta (neutralisation reaction) wuxuu ka dhex dhacaa sulfuric acid iyo potassium hydroxide milan (solution), oo soo saara potassium sulfate milmi kara (soluble) iyo biyo (water).



Qor calaamadaha xaaladda (state symbols) ee isleegga calaamadda (symbol equation) lagu sharraxay erayo: Falgalka dhexdhexaadinta (neutralisation reaction) wuxuu ka dhex dhacaa hydrochloric acid iyo silver hydroxide milan (solution), oo soo saara silver chloride aan milmin (insoluble) iyo biyo (water).



# Isla'egyada neutralisation (Neutralisation equations)

Waa kee qaacidada (formula) cusbada (salt) birta laga sameeyay potassium hydroxide (KOH) iyo nitric acid (HNO<sub>3</sub>)?

**Jawaabaha:**

MgCl

PN<sub>3</sub>O

KNO<sub>3</sub>

**a**

**b**

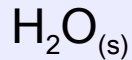
**c**



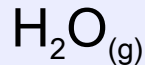
# Isla'egyada neutralisation (Neutralisation equations)

Sumadda (state symbol) biyaha (water) heerkulka qolka waa...

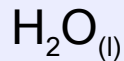
**a**



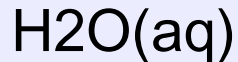
**b**



**c**



**d**



1) Isku dhig walaxda (substance) iyo xaaladda (state) si sax ah loogu muujiyey.

state (xaalad)

aqueous (milan)

gas (gaas)

liquid (dareere)

solid (adag)

| tusaale                              |                             |                                   |
|--------------------------------------|-----------------------------|-----------------------------------|
| $\text{CuO(s)}$                      | $\text{CaCO}_3 \text{ (s)}$ | $\text{LiCl}_2\text{(s)}$         |
| $\text{Hg(L)}$                       | $\text{HCl(aq)}$            | $\text{KOH(AQ)}$                  |
| $\text{H}_{2\text{(g)}}$             | $\text{Ar g}$               | $\text{He(g)}$                    |
| $\text{H}_2\text{SO}_4 \text{ (aq)}$ | $\text{NaOH (Aq)}$          | $\text{H}_2\text{O}_{\text{(l)}}$ |

1) Isku xidh xaaladda (state) iyo walaxda si sax ah oo ku matalaysa xaaladdaas.

xaalad (state)

aqueous (biyo-milan)

gaas (gas)

dareere (liquid)

adag (solid)

| tusaale                             |                       |                                 |
|-------------------------------------|-----------------------|---------------------------------|
| CuO(s)                              | CaCO <sub>3</sub> (s) | LiCl <sub>2</sub> (s)           |
| Hg(L)                               | HCl(aq)               | KOH(AQ)                         |
| H <sub>2</sub> (g)                  | Ar g                  | He(g)                           |
| H <sub>2</sub> SO <sub>4</sub> (aq) | NaOH (Aq)             | H <sub>2</sub> O <sub>(l)</sub> |

2) Saxi qodobadan.

Falgal (reaction) (gubasho / dhexdhexaadin) ah, cusbada (salt) la sameeyo waxaa loogu magac daraa birta ku jirta saldhigga iyo asiidhka la isticmaalay.



**Caasha**

Marka la isticmaalo asiidhka hydrochloric, cusbada (salt) birta ah ee la sameeyo waxaa loo yaqaan sulfate birta.



**Yacquub**

Zinc oxide waxay la falgashaa asiidhka nitric si ay u samayso cusbo (salt) loo yaqaan magnesium nitrate.



**Cabdi**

2)

Falgal (reaction) dhexdhexaadin ah, cusbada (salt) la sameeyo waxaa loogu magac daraa birta ku jirta saldhigga iyo asiidhka la isticmaalay.



**Caasha**

Marka la isticmaalo asiidhka hydrochloric, cusbada (salt) birta ah ee la sameeyo waxaa loo yaqaan chloride birta. Sidoo kale la aqbali karo: Marka la isticmaalo asiidhka sulfuric, cusbada (salt) birta ah ee la sameeyo waxaa loo yaqaan sulfate birta.



**Yacquub**

Zinc oxide waxay la falgashaa asiidhka nitric si ay u samayso cusbo (salt) loo yaqaan zinc nitrate.



**Cabdi**

Sidoo kale la aqbali karo: magnesium oxide waxay la falgashaa asiidhka nitric si ay u samayso cusbo (salt) loo yaqaan magnesium nitrate.

3) Magacaw cusbada (salt) birta ah ee la sameeyo marka hydroxide birta iyo oxide birta ay la falgalaan asiidhka.

| magaca asiidhka | name of metal salt ending |
|-----------------|---------------------------|
| hydrochloric    | chloride                  |
| sulfuric        | sulfate                   |
| nitric          | nitrate                   |

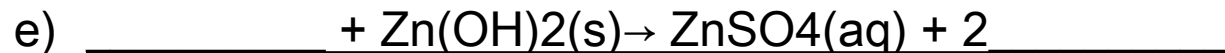
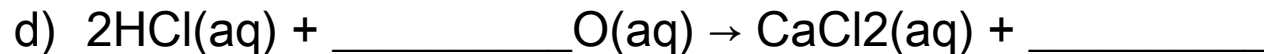
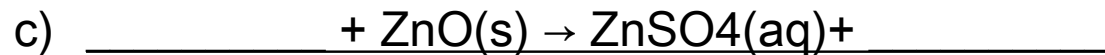
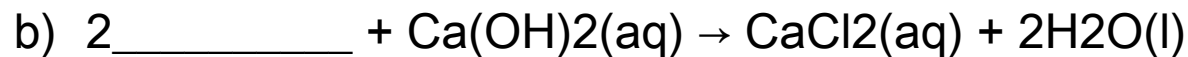
- a) magnesium oxide and nitric acid
- b) potassium hydroxide and sulfuric acid
- c) zinc oxide and hydrochloric acid
- d) lead hydroxide and hydrochloric acid
- e) lithium hydroxide and sulfuric acid

3) Magacaw cusbada birta ee la sameeyo marka hydroxide-yada birta iyo oxide-yada birta ay la falgalaan asiidhyada.

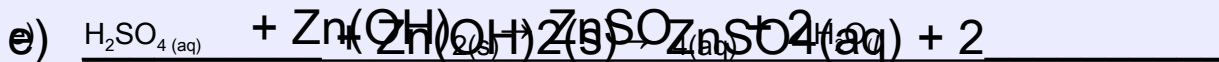
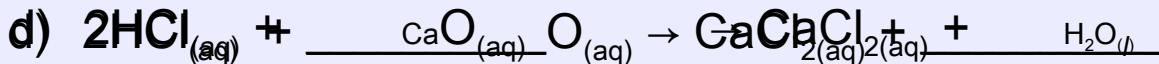
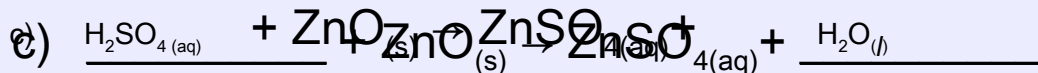
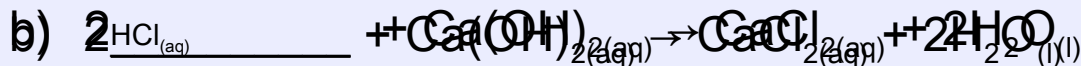
| name of acid         | name of metal salt ending |
|----------------------|---------------------------|
| hydrochloric         | klorayd (chloride)        |
| salfuurik (sulfuric) | salfayt (sulfate)         |
| nitrik (nitric)      | nitrayt (nitrate)         |

- a) magnesium oxide and nitric acid
- b) potassium hydroxide and sulfuric acid
- c) zinc oxide and hydrochloric acid
- d) lead hydroxide and hydrochloric acid
- e) lithium hydroxide and sulfuric acid

- 4) Dhammeysti isla'egyada oo ku dar calaamadaha xaaladda (state symbols) ee maqan iyadoo la isticmaalayo astaamaha kiimikada saxda ah. Isticmaal macluumaadka ku jira jaantusyada si ay kuu caawiyaan.



4) Dhammeysti isla'egyada adoo isticmaalaya astaamaha kiimikada saxda ah.



In chemical equations (s), (l), (g) and (aq) identify the state of each substance as solid, liquid, gas or in solution.

Neutralisation reaction general equation is:

base + acid  $\rightarrow$  metal salt + water

Sodium hydroxide wuxuu leeyahay formula  $\text{NaOH(aq)}$  iyo hydrochloric acid wuxuu leeyahay formula  $\text{HCl(aq)}$

In a neutralisation reaction, the salt formed is named after the metal (from the base) and acid used.

Salalka caadiga ah waxaa ka mid ah oxide-yada birta iyo hydroxide-yada tusaale ahaan  $\text{CuO}$  iyo  $\text{KOH}$ .