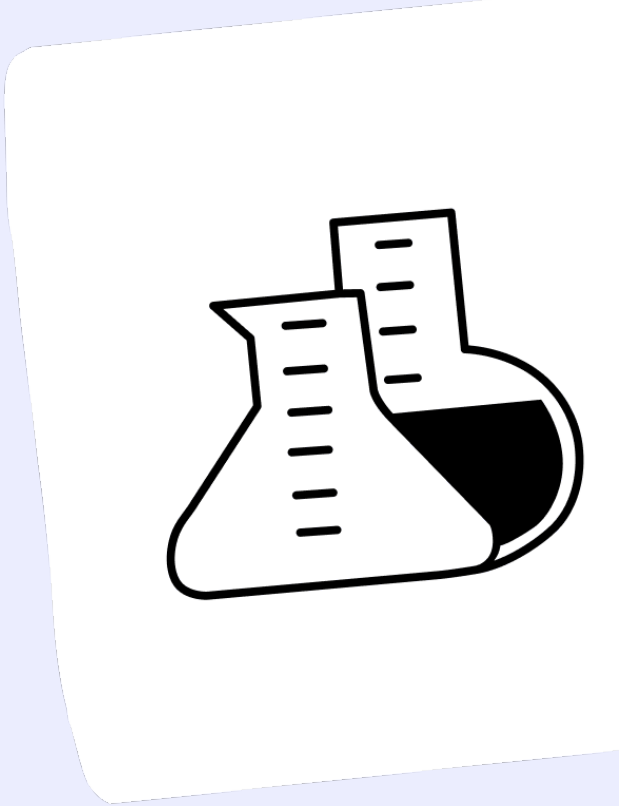
Biraha Kooxda 1 iyo 2



Chemistry

Cutub: Qaababka shaxda xilliyeedka (periodic table)

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Natiijo

Waxaan qeexi karaa qaabka falcelinta (reaction) ee biraha Kooxda 1 ee biyo (water) iyo Kooxda 2 ee asiidhka (acid) khafiifka ah, oo aan isbarbardhigi karaa falcelinta labada kooxood.

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Erayada muhiimka ah

alkali (alkali)

alkaline (alkaline)

koox (group)

xilli (period)

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Erayada muhiimka ah

Alkali waa sal (base) milma oo pH ka weyn 7.

Alkaline waxaa loola jeedaa walax leh sifooyin alkali ah ama ka kooban alkali. Inta badan waxaa loo adeegsadaa in lagu qeexo milan (solution) salalka (bases) milma oo pH ka weyn 7.

Koox (group) waa tiir ku yaal shaxda xilliyeedka (periodic table) oo u dhigma tirada elektarooniga ee golka kore ee atamka.

Xilli (period) waa saf ku yaal shaxda xilliyeedka (periodic table) oo u dhigma tirada golalka elektarooniga (electron shells) ee atamka.

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Biraha Kooxda 1 iyo 2

- Kooxda 1: Biraha alkali (alkali metals)
- Kooxda 2: Biraha alkaline earth (alkaline earth metals)

Kooxda 1: Biraha alkali (alkali metals)

Sharaxaad

Curiyeyaasha (elements) isku kooxda ah waxay leeyihiin sifooyin isku mid ah, oo inta badan waxay muujiyaan isbeddel ku yimaada sifooyinkan inta kooxda oo dhan.

Key

relative atomic mass
atomic symbol
name
atomic (proton) number

							1 H hydrogen 1										4 He helium 2
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[98] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La * lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86
[223] Fr francium 87	[226] Ra radium 88	[227] Ac * actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[264] Bh bohrium 107	[277] Hs hassium 108	[268] Mt meitnerium 109	[271] Ds darmstadtium 110	[272] Rg roentgenium 111	[285] Cn copernicium 112	[286] Nh nihonium 113	[289] Fl flevorium 114	[289] Mc moscovium 115	[293] Lv livermorium 116	[294] Ts tennessine 117	[294] Og oganesson 118

*Elements with atomic numbers 58-71 and 90-103 have been omitted from this periodic table.

Kooxda 1: Biraha alkali (alkali metals)

Sharaxaad

Kooxda 1 waxaa loola jeedaa curiyeyaasha (elements) ku yaal tiirka bidixda ugu dambeeya ee shaxda xilliyeedka (periodic table).

Curiyeyaasha (elements) Kooxda 1 waa biro: lithium, sodium, potassium, rubidium, caesium, iyo francium.

1	2											3	4	5	6	7	0
						H hydrogen											He helium
Li lithium	Be beryllium											B boron	C carbon	N nitrogen	O oxygen	F fluorine	Ne neon
Na sodium	Mg magnesium											Al aluminium	Si silicon	P phosphorus	S sulfur	Cl chlorine	Ar argon
K potassium	Ca calcium	Sc scandium	Ti titanium	V vanadium	Cr chromium	Mn manganese	Fe iron	Co cobalt	Ni nickel	Cu copper	Zn zinc	Ga galium	Ge germanium	As arsenic	Se selenium	Br bromine	Kr krypton
Rb rubidium	Sr strontium	Y yttrium	Zr zirconium	Nb niobium	Mo molybdenum	Tc technetium	Ru ruthenium	Rh rhodium	Pd palladium	Ag silver	Cd cadmium	In indium	Sn tin	Sb antimony	Te tellurium	I iodine	Xe xenon
Cs caesium	Ba barium	La* lanthanum	Hf hafnium	Ta tantalum	W tungsten	Re rhenium	Os osmium	Ir iridium	Pt platinum	Au gold	Hg mercury	Tl thallium	Pb lead	Bi bismuth	Po polonium	At astatine	Rn radon

*Elements with atomic numbers 58-71 have been omitted from this part of the periodic table.

Waxaa loo yaqaannaa biraha alkali (alkali metals) sababtoo ah waxay sameeyaan hydroxide-ka birta (alkalis) markay la falgalaan biyo (water), iyagoo abuuraya milan alkaline (alkaline solution).

Run mise been?

Biyaha (water) ayaa ku milmi doona birta Kooxda 1 si ay u sameeyaan milano (solutions) alkaline ah.

T **Run**

F **Been** ✓

Sabab u sheeg jawaabtaada

a Markay biraha la falgalaan biyo (water) way miraxaan.

b Waxay soo saaraan hydroxide-yada birta (alkalis) markay la falgalaan (react) biyaha (water), iyagoo samaynaya milan (solution) alkaline ah. ✓

Kooxda 1: Biraha Alkali

Sharaxaad

Kooxda 1 waxay ka kooban tahay curiyeyaal (elements) bir ah oo leh sifooyin kiimiko iyo jireed oo aad isugu dhow.

Marka loo barbardhigo inta badan biraha, waxay:

- yihiin kuwo jilicsan
- leeyihiin dhibco dhalaal hoose
- yihiin kuwo falgal (reactive) badan
- leeyihiin cufnaan (density) hoose

Biraha Kooxda 1 waxay la falgalaan (react) biyaha (water) si ay u sameeyaan hydroxide-yada birta iyo gaasta hydrogen.

Birta Kooxda 1 + biyo (water) → hydroxide birta + hydrogen

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Kooxda 1: Biraha Alkali

Sharaxaad

Li

Na

K

Rb

Cs

Waxaa jira isbeddello dhowr ah oo ku saabsan sifooyinka jireed marka hoos loo dhaco kooxda. Kuwaas waxaa ka mid ah:

- kordhinta cufnaanta (density)
- hoos u dhaca dhibcaha dhalaalka iyo karkarinta

Xusuusnow: cufnaantu (density) waa cabbirka cufka (mass) halkii cutub mug (volume) ah; waxay muujinaysaa sida walxaha (particles) walaxda ugu urursan yihiin meel la siiyay.

Kooxda 1: Biro alkali (Alkali metals)

Sharaxaad

Curiyeyaasha (elements) kooxda 1 dhamaantood waa adag (solids) heerkulka qolka.

Francium waa mid ka mid ah curiyeyaasha (elements) ugu degganaanshaha yar (least stable) uguna falgalka badan (most reactive) ee shaxda xilliyeedka (periodic table).

Xaqiiqooyinka ku saabsan francium waxaa ka mid ah:

- Waa curiye (element) aad u shucaac badan (radioactive).
- Wuxuu ku dhacaa si dabiici ah, sidoo kale waa la sameyn karaa (synthesised).

- Sifooyinkiisa jireed (physical properties), sida barta dhalaalka (melting point) iyo cufnaanta (density), waa la saadaaliyay waxaana loo malaynayaa inay la mid yihiin kuwa caesium.

Kooxda 1: Biro alkali (Alkali metals)

Hubi

Marka la barbardhigo biraha badankood, yaa run ah oo ku saabsan biraha kooxda 1?

a waxay leeyihiin barta dhalaalka (melting point) sare

b way ka jilicsan yihiin (softer) ✓

c way ka falgal badan yihiin (more reactive) ✓

d way ka cufan yihiin (more dense)

Hubi

Run mise been?

Biraha kooxda 1 waxay muujiyaan isbeddel (trend) sifooyinka iyada oo loo marayo kooxda.

T Run ✓

F Been

Sabab u sheeg jawaabtaada

a Cufnaanta (density) biraha waxay kordhisaa kor u kaca kooxda.

b Barta dhalaalka (melting point) biraha waxay hoos u dhacdaa hoos u dhaca kooxda. ✓

Kooxda 1: Biro alkali (Alkali metals)

1. Ama daawo macallinkaaga oo dhamaystiraya muujinta (demonstration) ama daawo fiidiyowga la bixiyay si aad u buuxiso jaantuska.

Watch ▶

Curiye (Element)	Muujin (Appearance)	Sidee ayay u fududahay in lagu gooyo mindi?	Maxaa dhacaya marka lagu daro biyo (water)?
lithium (lithium)			
sodium (sodium)			
potassium (potassium)			

2. Dhamaadka fiidiyowga, milan (solution) tilmaame guud (universal indicator solution) ayaa lagu daraa biyaha (water). Maxay tilmaantu (indicator) u beddeshaa midabkeeda?

3. Sharax isbeddelka falcelinta (reactivity) curiyeyaasha (elements) hoos u dhaca Kooxda 1.

3. Soo jeedi sababta alkali metals loogu kaydiyo saliid (oil).

3. Sharax isbeddelka sifooyinka jireed (physical properties), sida heerarka dhalaalka (melting points) iyo cufnaanta (density), hoos u dhaca Kooxda 1.

3. Qor isla'egta ereyga (word equation) falcelinta (reaction) u dhaxaysa lithium (lithium) iyo biyaha (water).

1) Buuxi shaxda hoose.

Curiye (Element)	Muqaal (Appearance)	Sidee u fudud yahay in lagu jaro mindi (knife)?	Maxaa dhacaya marka lagu daro biyaha (water)?
lithium (lithium)	dull bir ah oo dibadda ah, dhalaalaya gudaha	waxaa lagu jari karaa mindi (knife)	wuxuu sameeyaa goobo (sphere) oo dul sabbeeya (floats on surface), wuxuu xumbooyaa
sodium (sodium)	dull bir ah oo dibadda ah, dhalaalaya gudaha	ka fudud in lagu jaro mindi (knife)	isku mid sidii kor ku xusan, laakiin ka dhakhso badan oo laga yaabo inuu soo saaro olol jaalle ah
potassium	dibadda caajis ah, gudaha dhalaalaya	xitaa ka fudud in lagu gooyo mindi	isku mid sidii kor ku xusan, xitaa ka dhakhso badan, oo soo saara olol lilac ah (laga yaabo inuu qarxo)

2) Dhamaadka fiidiyowga, universal indicator (UI) solution ayaa lagu daray biyaha. Maxay UI beddeshaa midabka?

Universal indicator waa cagaar marka solution-ku yahay neutral, laakiin wuxuu isu beddelaa buluug marka solution-ku yahay alkaline, sida solution-ka soo baxa marka Group 1 metals ay la falgalaan biyaha.

3) Sharax isbeddelka falgalnimada (reactivity) ee curiyeyaasha (elements) hoos u dhaca Kooxda 1.

Metals-ku waxay noqdaan kuwa ka falgala badan markaad hoos u dhaqaaqdo kooxda.

4) Soo jeedi sababta alkali metals loogu kaydiyo saliid.

Metals-ku waxay aad u falgala badan yihiin biyaha iyo oxygen-ka hawada, laakiin kuma falgalaan saliidda. Tani waxay ka ilaalisaa inay falgalaan si ay u sameeyaan compounds, taasoo u oggolaanaysa inay ahaadaan metals saafi ah.

5) Sharax isbeddelka sifooyinka jireed (physical properties), sida heerkulka dhalaalida (melting points) iyo cufnaanta (density), hoos u dhaca Kooxda 1.

Hoos u dhaca kooxda, metals-ku waxay noqdaan kuwa cufan (denser), heerkulkooda dhalaalida iyo karkarinta (boiling points) way hoos u dhacaan.

6) Qor isla'egta erayada (word equation) ee falgalka (reaction) ee u dhexeeya lithium iyo biyaha.

lithium + biyo → lithium hydroxide + hydrogen

Kooxda 1 iyo 2 metals

- Kooxda 1: Alkali metals
- Kooxda 2: Alkaline earth metals

Kooxda 2: Alkaline earth metals

Sharaxaad

Kooxda 2 waxaa loola jeedaa curiyeyaasha (elements) ku jira tiirka labaad ee shaxda xilliyeedka (periodic table).

Curiyayaasha (elements) ku jira Group 2 waa biro (metals): beryllium, magnesium, calcium, strontium, iyo barium.

1	2											3	4	5	6	7	0
						H hydrogen											He helium
Li lithium	Be beryllium											B boron	C carbon	N nitrogen	O oxygen	F fluorine	Ne neon
Na sodium	Mg magnesium											Al aluminium	Si silicon	P phosphorus	S sulfur	Cl chlorine	Ar argon
K potassium	Ca calcium	Sc scandium	Ti titanium	V vanadium	Cr chromium	Mn manganese	Fe iron	Co cobalt	Ni nickel	Cu copper	Zn zinc	Ga galium	Ge germanium	As arsenic	Se selenium	Br bromine	Kr krypton
Rb rubidium	Sr strontium	Y yttrium	Zr zirconium	Nb niobium	Mo molybdenum	Tc technetium	Ru ruthenium	Rh rhodium	Pd palladium	Ag silver	Cd cadmium	In indium	Sn tin	Sb antimony	Te tellurium	I iodine	Xe xenon
Cs caesium	Ba barium	La* lanthanum	Hf hafnium	Ta tantalum	W tungsten	Re rhenium	Os osmium	Ir iridium	Pt platinum	Au gold	Hg mercury	Tl thallium	Pb lead	Bi bismuth	Po polonium	At astatine	Rn radon

*Elements with atomic numbers 58-71 have been omitted from this part of the periodic table.

Waxaa loo yaqaan 'alkaline earth metals' sababtoo ah waxay soo saaraan 'metal hydroxides' (alkalis) markay la falgalaan biyo (water). Erayga "earth" waxaa isticmaali jiray farmashiyeyaashii hore si ay u qeexaan walxaha aan birta ahayn ee aan ku milmin biyaha (water).

Group 2: Alkaline earth metals

Sharaxaad

Group 2 wuxuu ka kooban yahay curiyayaal bir ah (metallic elements) oo leh sifooyin kiimiko (chemical) iyo jireed (physical) oo aad isugu dhow.

	1	2
1		
2	Li lithium	Be beryllium
3	Na sodium	Mg magnesium

Marka la barbardhigo curiyayaasha (elements) Group 1, waxay:

- ka adag yihiin
- leeyihiin dhibco dhalaal (melting points) oo sareeya
- ka falgal (reactive) yar yihiin
- ka cufan (dense) yihiin

… marka loo eego curiyaha (element) Group 1 ee isla muddada (period) ah.

Biyaha (metals) Group 2 waxay la falgali doonaan aashito (acid) si ay u sameeyaan cusbo (salts) iyo gaas hydrogen.

Bir (metal) Group 2 + aashito (acid) → cusbo bir ah (metal salt) + hydrogen

Group 2: Alkaline earth metals

Hubi

Marka la barbardhigo biraha (metals) Group 1, biraha (metals) Group 2:

a ka jilicsan yihiin.

b leeyihiin dhibco dhalaal (melting) iyo karkarin (boiling) oo hooseeya.

c ka falgal (reactive) yar yihiin. ✓

d ka cufan (dense) yar yihiin.

Kooxda 2: Biraha dhulka alkaline (Alkaline earth metals)

1) Baar sida falcelinta (reactivity) ee biraha Kooxda 2 ugu beddelanto hoos u dhaca kooxda adoo isbarbardhigaya laba bir oo Kooxda 2 ah.

   a) Isticmaal dhululubo qiyaas (measuring cylinder) si aad ugu shubto si sax ah 50 cm^3 oo aashito hydrochloric ah oo khafiif ah (dilute hydrochloric acid) galaas (beaker).

   b) Isla daqiiqaddaas, bilow timer-ka oo ku dar qayb 4 mm ah oo ribbon magnesium ah.

   c) Sharax sida xawaaraha xumbooyinka loo soo saaro. Qor inta ay socoto falgal (reaction) xooggan ama tiri tirada xumbooyinka la soo saaro hal daqiiqo.

   d) Taabo bannaanka tuubada tijaabada (test tube) si aad u hubiso isbeddel kasta oo heerkulka ah.

   e) Record your observations.

   f) Ku celi tillaabooyinka a)–e) oo leh xabbad 4 mm ah oo birta kalsiyum ah.

   g) Repeat steps a)–f) using water instead of acid.

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2) Strontium waa bir Kooxda 2 ah oo ka hooseysa calcium ee shaxda xilliyeedka (periodic table).

Saadaali sida strontium ula falgali lahaa biyo (water) iyo asiidh (acid) khafiif ah, marka la barbar dhigo calcium iyo magnesium.

magnesium

calcium

strontium

1	2											3	4	5	6	7	0
						H hydrogen											He helium
Li lithium	Be beryllium											B boron	C carbon	N nitrogen	O oxygen	F fluorine	Ne neon
Na sodium	Mg magnesium											Al aluminium	Si silicon	P phosphorus	S sulfur	Cl chlorine	Ar argon
K potassium	Ca calcium	Sc scandium	Ti titanium	V vanadium	Cr chromium	Mn manganese	Fe iron	Co cobalt	Ni nickel	Cu copper	Zn zinc	Ga galium	Ge germanium	As arsenic	Se selenium	Br bromine	Kr krypton
Rb rubidium	Sr strontium	Y yttrium	Zr zirconium	Nb niobium	Mo molybdenum	Tc technetium	Ru ruthenium	Rh rhodium	Pd palladium	Ag silver	Cd cadmium	In indium	Sn tin	Sb antimony	Te tellurium	I iodine	Xe xenon
Cs caesium	Ba barium	La* lanthanum	Hf hafnium	Ta tantalum	W tungsten	Re rhenium	Os osmium	Ir iridium	Pt platinum	Au gold	Hg mercury	Tl thallium	Pb lead	Bi bismuth	Po polonium	At astatine	Rn radon

*Elements with atomic numbers 58-71 have been omitted from this part of the periodic table.

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1) Indho-indheyntaadu waa inay la mid tahay kuwan:

Birta Kooxda 2	indho-indheyn ku saabsan asiidh (acid) khafiif ah	indho-indheyn ku saabsan biyo (water)
magnesium	fizzing badan 140 ilbiriqsi, tuubada tijaabada ayaa kululaata	24 xumbo 60 ilbiriqsi gudahood tuubada tijaabada ma kululeyn
calcium	fizzing badan, xoogaa candhuuf ah iyo dhawaaq shidmo ah 90 ilbiriqsi tuubbo tijaabo (test tube) ayaa kululaata (gets hot)	xoogaa xumbo (fizzing) ah in ka badan 3 daqiiqo tuubbo tijaabo (test tube) ayaa diirmaata (gets warm)

2) Strontium waxay ula falgali lahayd si xoog badan biyo (water) iyo asiidh (acid) khafiif ah.
Biraha Kooxda 2 waxay noqdaan kuwa falgal (reaction) badan marka ay hoos u dhacaan kooxda.

Soo koobid

Biraha Kooxda 1 iyo 2 (Group 1 and 2 metals)

Sifooyinka curiyeyaasha (elements) ee koox kasta oo ka mid ah shaxda xilliyeed (periodic table) ayaa si tartiib ah u isbeddela markaad hoos ugu dhaqaaqdo kooxda.

Biraha Kooxda 1 (Group 1 metals) waa jilicsan yihiin waxayna leeyihiin cufnaan (densities) ka hooseeya biraha kale; waxay noqdaan kuwo falgal (reactive) badan markaad hoos ugu dhaqaaqdo kooxda.

Biraha Kooxda 1 (Group 1 metals) waxay la falgalaan (react) biyo (water) si ay u sameeyaan milan alkaline (alkaline solution) iyo hydrogen (hydrogen), taas oo sababta loogu yeedho biraha alkali (alkali metals).

Biraha Kooxda 2 (Group 2 metals) waxay la falgalaan (react) asiidhyo (acids) khafiif ah si ay u soo saaraan cusbo (salt) iyo gaas hydrogen (hydrogen gas).

Biraha Kooxda 2 (Group 2 metals) waxay noqdaan kuwo falgal (reactive) badan markaad hoos ugu dhaqaaqdo kooxda, laakiin waxay ka yar yihiin falgalka (reactive) biraha Kooxda 1 (Group 1 metals) ee xilliga (period) isku midka ah.

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