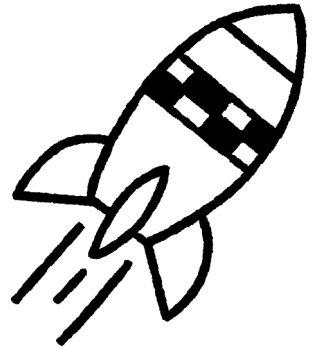


Falgal (reaction) kiimiko: oksaydhays (oxidation)

Sayniska

Cutub: Fahanka falgal (reaction) kiimiko



Natiijo

Waxaan qiyaasi karaa falgal (reaction) oksaydhays (oxidation), oo ay ku jiraan gubasho iyo miridhku, waxaana magacaabaa waxsoosaarka qaar ka mid ah falgal (reaction) oksaydhays (oxidation).

Erayada muhiimka ah

**oksaydhays
(oxidation)**

oksaydh (oxide)

miridh (rusting)

daxaleys (corrosion)

Oksaydhays (oxidation) waa nooc ka mid ah falgal (reaction) kaas oo oksijiin (oxygen) ku xidhma curiyeyaasha fal-celiyeyaasha.

Oksaydh (oxide) waa iskudhis ka kooban oksijiin (oxygen) kaas oo la sameeyo inta lagu jiro falgal (reaction) oksaydhays (oxidation).

Miridh (rusting) waxaa loola jeedaa daxaleys (corrosion) birta ama birta (steel), marka ay joogaan biyo (water) iyo oksijiin (oxygen).

Daxaleys (corrosion) waa marka bir yaraato cabbirkiisa sababtoo ah falgal (reaction) kiimiko.

Falgal (reaction) kiimiko: oksaydhays (oxidation)



Oksaydhays (oxidation)



Miridh (rusting)

Oksaydhays (oxidation)



Sharaxaad

Oksaydhays (oxidation) waa marka walax falceliso oo ay ku biirto oksijiin (oxygen), tusaale ahaan gubasho iyo miridh (rusting).



qoryo gubanaya



agabyo miridhsan

Marka biraha ay falceliyaan oksijiin (oxygen) waxay soo saaraan oksaydh (oxide) bir ah.

Isle'eg guud (General equation):
bir (metal) + oxygen $\rightarrow$ bir oxide (metal oxide)

magnesium + oxygen $\rightarrow$ magnesium oxide

aluminium + oxygen $\rightarrow$ aluminium oxide

sodium + oxygen $\rightarrow$ sodium oxide



gubista magnesium
(burning magnesium)

Oxidation (Oxidation)

Dhammeysti weedha. Oxidation (Oxidation) waa marka shay uu falgal (reaction) la sameeyo ...

a carbon dioxide.

b nitrogen.

c oxygen.



d oxides.

Oxidation (Oxidation)

Magacaw badeecada (product) la sameeyo marka birta lithium ay falgal (reaction) la sameeyso oxygen.

a

lithium oxygen

b

lithium oxide



c

magnesium oxide

d

lithium carbonate

Xawaaraha (speed/rate) falgalka oxidation (oxidation reaction) wuu kala duwanaan karaa. Xawaaraha oxidation (oxidation rate) wuxuu noqon karaa mid aad u degdeg badan (tusaale, ilbiriqsi gudahood) ama mid aad u gaabiya (tusaale, sannado badan).



rasaasta (fireworks) oo gubanaysa (combusting)



Qadaadiicda naxaasta (copper coins) ee Roomaanka ah oo oxidised (oxidised)

Dhammeysti weedha. Oxidation (Oxidation) wuxuu dhacaa ...

a heerar gaabis ah.

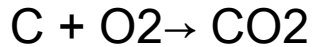
b heerar kala duwan.



c heerar degdeg ah.

Curuuraha aan bir ahayn waxay mari karaan oksaydhaysi (oxidation) si ay u soo saaraan oksaydh aan bir ahayn.

kaarboon + oksijiin → kaarboon laba-oksaydh



nitrojiin + oksijiin → nitrojiin laba-oksaydh



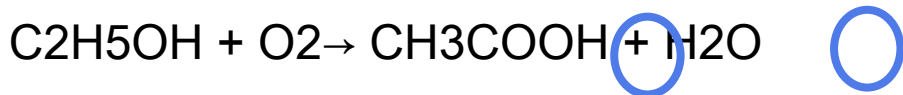
Xeryahooda aan bir ahayn sidoo kale waxay mari karaan oksaydhaysi (oxidation) si ay u soo saaraan oksaydhyo iyo xeryo kale.

Biyuhu (water) waa oksaydh (oxide) oo hydrogen ah.

meyaane + oksijiin → kaarbon laba-oksaydh + biyo (water)



etanol + oksijiin → ethanoic acid + biyo (water)



Atamka aan bir ahayn, tirada atamka oksijiin waxaa lagu muujiyaa magaca oksaydhka.

tirada atamka oksijiin ee oksaydhka	horgale (prefix)	tusaale	qaacidada (formula)
1	mono	carbon monoxide (carbon monoxide)	CO
2	di	carbon dioxide (carbon dioxide)	CO ₂
3	tri	sulfur trioxide (sulfur trioxide)	SO ₃
4	tetr	dinitrogen tetroxide (dinitrogen tetroxide)	N ₂ O ₄
5	pent	arsenic pentoxide (arsenic pentoxide)	As ₂ O ₅

Maxay noqon doontaa walaxda (substance) la soo saaro marka birta (non-metal) sulfur ay la falgasho (react) oksijiin (oxygen)?

a

sulfur oksijiin (sulfur oxygen)

b

sulfur dioxide (sulfur dioxide) ✓

c

carbon dioxide (carbon dioxide)

d

sulfide dioxide (sulfide dioxide)

Haanta gaaska (gas jar) waxaa ku jira oksijiin (oxygen) saafi ah. Qayb yar oo sulfur ah oo la kululeeyay ayaa la geliyaa haanta gaaska. Sulfur-ku wuxuu gubaa (burns) si dhalaalaya. Waa maxay walaxda (substance) (ama walxaha) la soo saaro?

a

$\text{CO}_2 + \text{H}_2\text{O}$

b

SO_2 kaliya



c

$\text{CO}_2 + \text{H}_2\text{O} + \text{SO}_2$

Dooro bayaanka/ka saxda ah. Biyo (water) waxay ka kooban yihiin laba atom oo hydrogen ah oo ku xidhan hal atom oo oxygen ah.

a Biyo (water) waxay leeyihiin formula H_2O marka waa oxide.



b Biyo (water) ma aha oxide.

c Biyo (water) waxay leeyihiin formula H_2O marka waxaa loo yaqaan hydrogen dioxide.

d Biyo (water) waxay leeyihiin formula H_2O_2 marka waa oxide.

Run mise been?

Waxaa jira 5 atom oo oxygen ah oo ku jira phosphorus trioxide oo leh formula P_2O_5 .



Run



Been



Sabab u sheeg jawaabtaada

a

Horgale (prefix) 'tri' macneheedu waa saddex, magacu waa inuu ahaado diphosphorus pentoxide maadaama ay jiraan 5 atom oo oxygen ah oo ku xidhan 2 atom oo phosphorus ah.

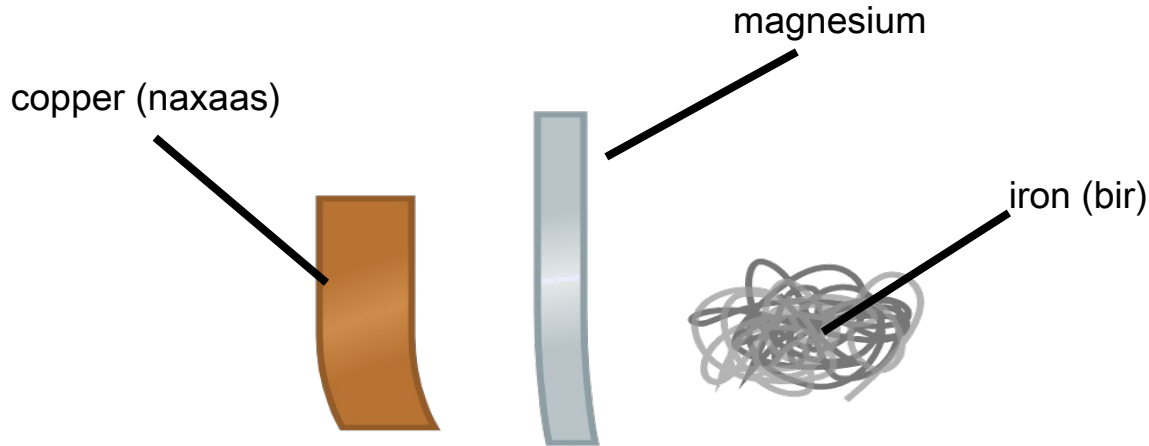


b

Horgale (prefix) 'di' macneheedu waa 2, magacu waa inuu ahaado pentaphosphorus dioxide maadaama ay jiraan 2 atom oo oxygen ah oo ku xidhan 5 atom oo phosphorus ah.

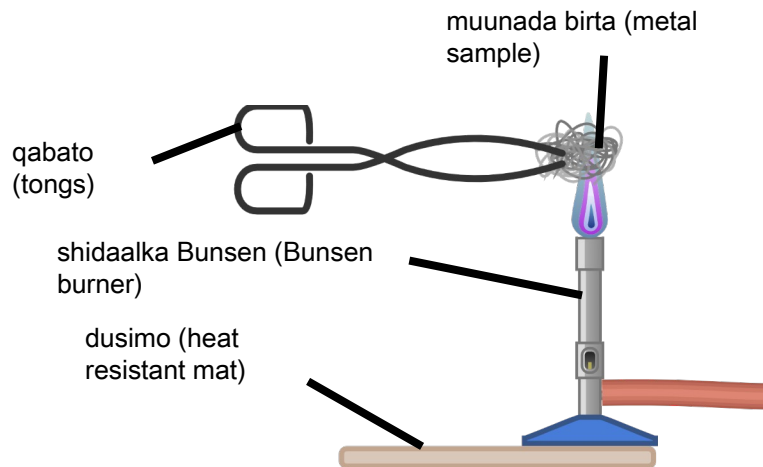
- 1) a) Dhammeystir tijaabada (experiment) oksaydhayska (oxidation). Macallinkaagu wuxuu ku siin doonaa saddex muunad oo bir ah si aad u tijaabiso.

Tallaabada 1: Fiiri muuqaalka muunadda birta oo ku qor jaantuska natiijooyinka.



- 1) a) Dhammeystir tijaabada (experiment) oksaydhayska (oxidation). Macallinkaagu wuxuu ku siin doonaa saddex muunad oo bir ah si aad u tijaabiso.

Tallaabada 2: Kululee muunada birta (metal sample) ololka buluugga ah ee shidaalka Bunsen (Bunsen burner flame) oo qor indho-indhaynta (observations) miiska natiijooyinkaaga (results table).



Tallaabada 3: Ka saar wax-soo-saarka (product) ololka, fiiri muuqaalkiisa oo ku qor miiska natiijooyinkaaga (results table).

Tallaabada 4: Ku celi tallaabooyinka 2 iyo 3 muunadaha birta (metal samples) ee haray.

b) Buuxi miiska natiijooyinka (results table).

muunada birta (metal sample)	indho-indhaynta (observation) ka hor kuleylinta	indho-indhaynta (observation) inta lagu jiro kuleylinta	indho-indhaynta (observation) ka dib kuleylinta
bir (iron)			
magnesium (magnesium)			
naxaas (copper)			

1) a) iyo b) Natiijooyinkaagu waxay la mid noqon karaan kuwan:

muunada birta (metal sample)	indho-indhaynta (observation) ka hor kuleylinta	indho-indhaynta (observation) inta lagu jiro kuleylinta	indho-indhaynta (observation) ka dib kuleylinta
bir (iron)	bir cawlan oo 'suuf' ah	wuxuu iftiimiyaa cas / oranji, dhimbilo oranji ah ayaa soo baxa wuu burburaa	birta waa madoobaataa
magnesium (magnesium)	xariijimo bir ah oo dhalaalaysa oo cawlan	wuxuu ku gubtaa olol cad oo dhalaalaya	bud cad / dambas ayaa samaysma
naxaas (copper)	xariijimo dhalaalaysa oo oranji / bunni / naxaas (copper) ah	wuxuu iftiimiyaa cas dhalaalaya ma dhalaaliyo mana gubto	midab madow / cawlan madow waa laga xaaqi karaa korka si loo muujiyo birta naxaasta (copper)

2) Isku xidh isleegyada ereyada ee falgalyada oxidation (oxidation).

bir (iron) + oxygen →

copper oxide (copper oxide)

magnesium + oxygen →

carbon dioxide (carbon dioxide)

naxaas (copper) + oxygen →

iron oxide (iron oxide)

phosphorous + oxygen →

magnesium oxide (magnesium oxide)

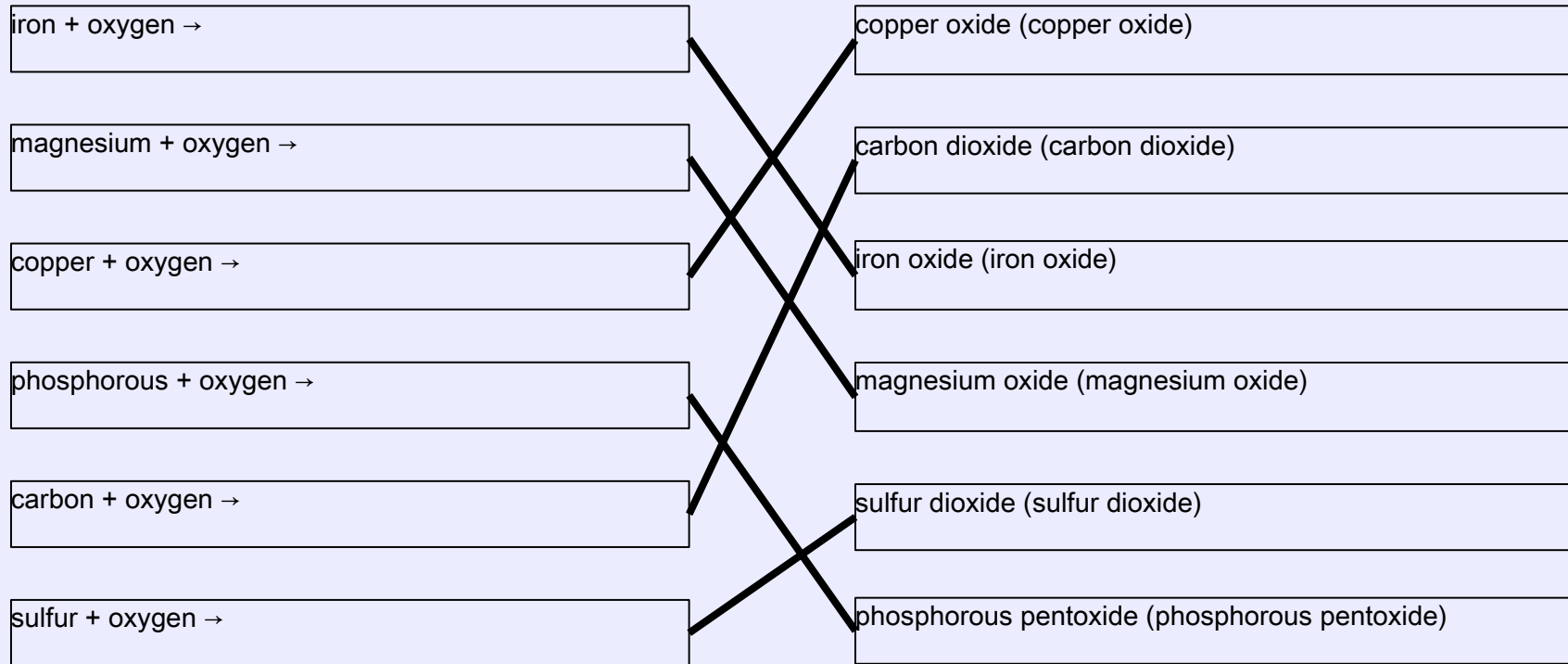
kaarboon (carbon) + oxygen →

sulfur dioxide (sulfur dioxide)

sulfur + oxygen →

phosphorous pentoxide (phosphorous pentoxide)

2) Isku xidh isleegyada ereyada ee falgalyada oxidation (oxidation).



Falgal kiimiko: oksaydh (oxidation)



Oxidation (Oxidation)



Miridh (Rusting)

Miridhku waa falgal oksaydh (oxidation) ka sii adag oo ka dhex dhaca birta, oksijiinta iyo biyaha (water).

Miridh (Rusting):

- waa taxane falgal (reactions)
- magaca kiimikada miridhku waa oksaydh bir (iron oxide)
- qaacidada miridhku waa Fe_2O_3
- waa nooc gaar ah oo daxal (corrosion)
- dusha birta waxaa dhaawaca falgal kiimiko (chemical reaction)



bir (iron) + oksijiin (oxygen) + biyo (water) → oksaydh bir (iron oxide) (miridh)

Magacow labada fal-celin ee loo baahan yahay si birta u miridho.

a

oksijiin (oxygen) iyo kaarboon laba ogsaydh (carbon dioxide)

b

oksijiin (oxygen) iyo biyo (water) ✓

c

biyo (water) iyo kaarboon laba ogsaydh (carbon dioxide)

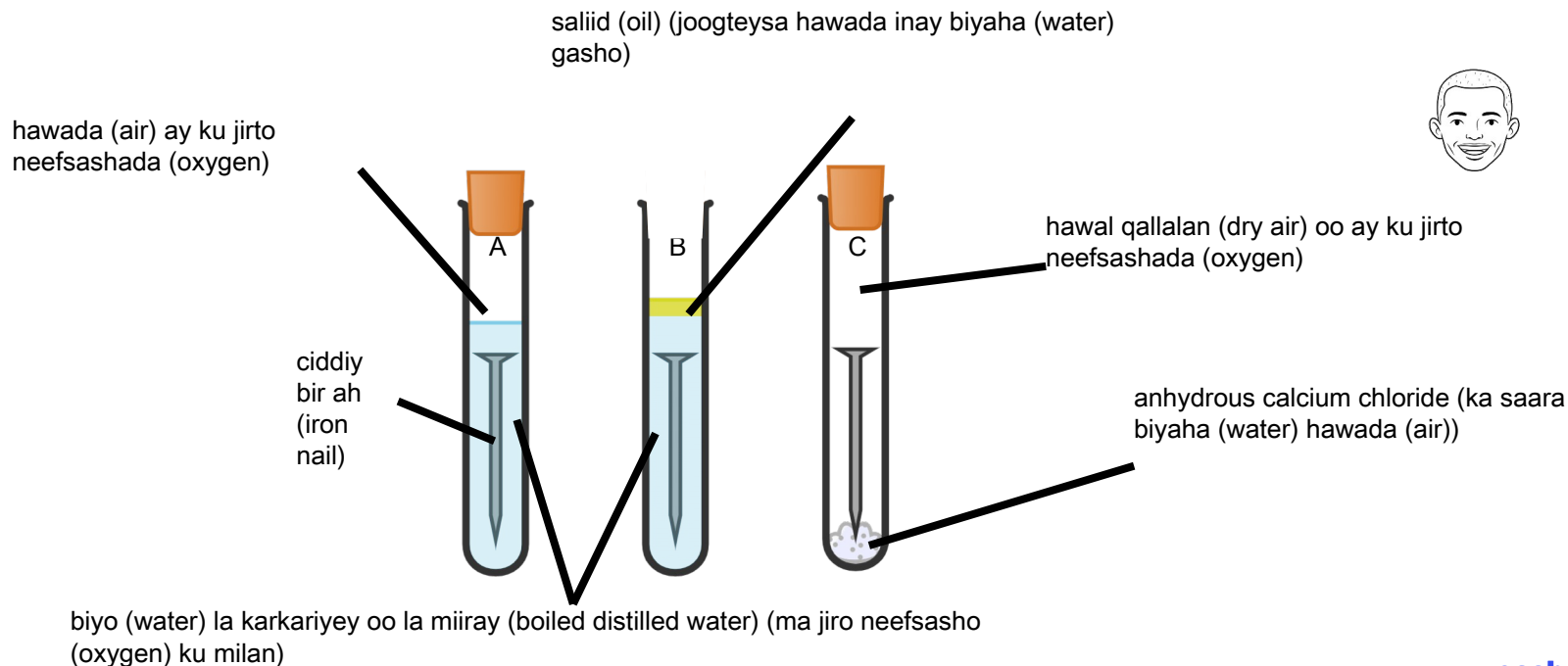
Habka miridhku (rusting) wuxuu daxaleeyaa (corrodes) birta (iron) iyo isku dhafyo badan oo bir ah oo ay ku jirto birta, tusaale ahaan, steel.

bir (iron) + oksijiin (oxygen) + biyo (water) → miridh (rust)

Si loo joojiyo ama loo yareeyo miridhka, birta waxaa lagu daweyn karaa:

- rinji (painting)
 - saliid (oiling)
 - dahaar bir kale (coating with another metal)
 - beddelidda isku dhafka birta (changing the mixture of the metal)
- joogteeya
neefsashada
(oxygen) iyo biyaha
(water) inay taabtaan
birta (iron)

- 1) Cali wuxuu qorsheeyay tijaabo (experiment) si loo go'aamiyo waxa birta (iron) miridhka (rust) keena. Wuxuu diyaariyay tuubooyinka tijaabada (test tubes) soo socda wuxuuna uga tagay laba toddobaad.



- a) Saadaali (Predict) waxa Cali ku arki doono tuubo kasta oo tijaabada (test tube) ah.



tuubada tijaabada (test tube)	biyo (water)	neefsashada (oxygen)	indha-indhaynta (observations) laba toddobaad ka dib
A	✓	✓	
B	✓	✗	
C	✗	✓	



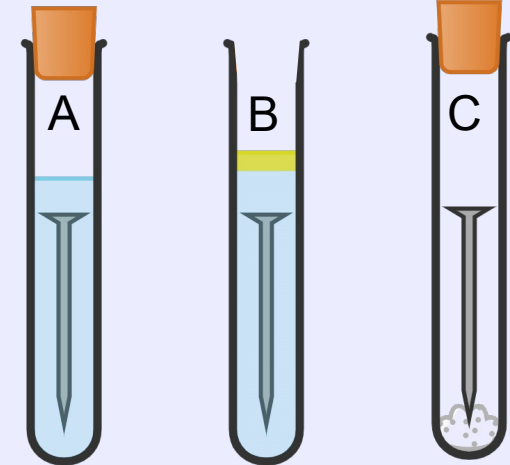
- b) Qor gunaanad (conclusion) tijaabada (experiment) Cali.

a) Saadaali waxa Cali uu ku arki doono tuubo kasta oo tijaabo (experiment) ah.

tuuba da tijaab ada (test tube)	biyo (water)	neefsa hada (oxygen)	ilaalinta laba usbuuc ka dib
A	✓	✓	
B	✓	✗	
C	✗	✓	

b) Qor gabagabo (conclusion) tijaabada (experiment) Cali.

c) Shirmeen (rusting) u dhaco, biyo (water) iyo oksijiin (oxygen) labaduba waa inay joogaan.



- 2) Baabuur waxaa laga sameeyaa bir (steel) oo ah bir (iron) ku salaysan, sidaas darteed waa la rinjiyeeyaa si aanu u mirmin (rust).
- a) Sharax sida rinjiyeynta baabuurka uga joojiso mirmeen (rusting).
 - b) Sharax waxa dhici doona haddii baabuurka la xoqo, ku dar nooca falgalka (reaction) ee dhaca.



2) Baabuur waxaa laga sameeyaa bir (steel) oo ah bir (iron) bir ah (metal) sidaas darteedna waa la rinjiyeeyaa si looga hortago inay daxalto (rust).

- a) Sharax sida rinjiyeynta baabuurka uga hortagto daxalka (rusting).
- b) Sharax waxa dhici lahaa haddii baabuurka xoqmo (scratched), ku dar nooca falgalka (reaction) ee dhaca.

Jawaabtaadu waa inay ku jirtaa:

- a) Rinjigu wuxuu ...
 - ka joojin oksijiin (oxygen) hawada iyo biyo (water) roobka
 - falgalka (reacting) birta (iron)
 - maxaa yeelay biyo (water) iyo oksijiin (oxygen) labaduba ayaa loo baahan yahay si birta (iron) u miranto.
- b) Haddii baabuurka la xoqo ...
 - oksijiin (oxygen) hawada iyo biyo (water) roobka
 - waxay la falgali doonaan birta (iron)
 - oo keeni doona mirmeen (rust).
 - Kani waa falgal oksidayn (oxidation reaction).

Marka shay (substance) falgalo (reacts) si uu ula midoobo oksijiin (oxygen), waxaa loo yaqaan oksideyshin (oxidation).

Tusaalooyinka oksideyshinta (oxidation) waa gubasho (combustion) iyo daxalto (rusting).

Mid ka mid ah alaabta (products) oksideyshinta (oxidation) had iyo jeer waa oksaydh (oxide), laakiin alaabta kale way kala duwan yihiin.

Daxalto (Rusting) waxay u baahan tahay oksijiin (oxygen) iyo biyo (water) labadaba inay joogaan.

Daxalta (Rusting) waxaa la joojin karaa iyadoo la dahaadho (coating) dusha birta (iron) birta ah (metal).