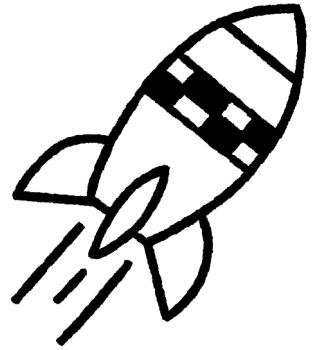


Falgal (reaction) kiimiko: gubasho (combustion)

Sayniska

Cutub: Fahanka falgal (reaction) kiimiko



Natiijo

Waxaan qeexi karaa hababka gubashada (combustion) iyo gubista, waana magacaabi karaa waxyaabaha ka soo baxa falgal (reaction)kan.

gubasho (combustion)

oksaydh (oxidation)

gubis (burning)

shidaal (fuel)

molecule (molecule)

Erayada muhiimka ah

Gubashada (combustion), shidaalku (fuel) wuxuu la falgalaa oksijiin (oxygen) si uu u sii daayo tamar, wuxuuna u baahan yahay shidaal (fuel), oksijiin (oxygen) iyo kulayl si uu u bilaabo falgal (reaction)ka.

Oksaydh (oxidation) waa nooc ka mid ah falgal (reaction) ka halkaasoo oksijiin (oxygen) uu ku xidhmaa curiyeyaasha fal-celiyeyaasha.

Gubistu (burning) waa nooc ka mid ah gubashada (combustion) halkaasoo walxuhu la falgalaan oksijiin (oxygen) oo ay soo saaraan olol muuqda.

Shidaalku (fuel) waa walax sii daysa tamarteeda kaydsan markay marayso gubasho (combustion).

Molecule (molecule) wuxuu ka kooban yahay laba ama in ka badan oo atom (atom) ah oo si kiimiko ah isugu xidhan. Kuwani badanaa waa atom (atom) aan bir ahayn.

Falgal (reaction) kiimiko: gubasho (combustion)



Gubis (burning) iyo gubasho (combustion)



Isla'egyada gubashada (combustion)

Gubashadu (combustion) waa falgal (reaction) kiimiko.

Si uu u dhaco, gubashadu (combustion) waxay u baahan tahay:

- shidaal (fuel)
- oksijiin (oxygen)
- kulayl (heat)



Gubis (burning):

dab xero oo gubanaya (a campfire burning)

- waa falgal (reaction) gubasho (combustion)
- halkaasoo dab ama olol la soo saaro



Gubashada dhuxusha (Combustion of charcoal):

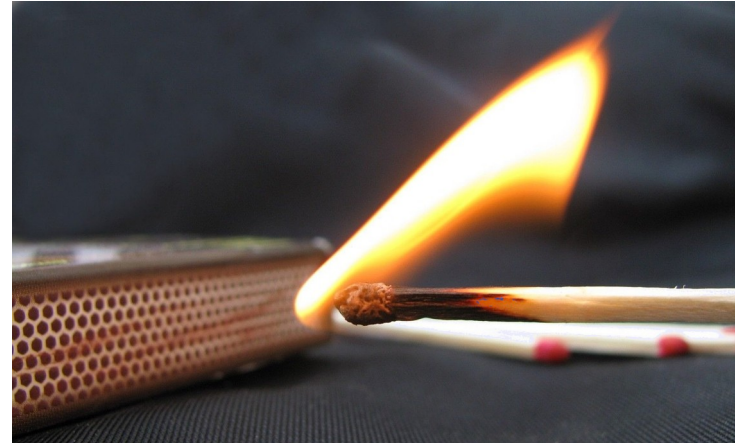
- oksaydhayshii (oxidation) waa socotaa
- olol ma leh (no flames)
- ma gubanayo (not burning)

Falgalo (reactions) badan waxay u baahan yihiin kulayl (heat) si loo bilaabo.

Shidaal-qabad (Safety matches) way iftiimaan marka kulaylka (heat) ka yimaada is-xoqidda (friction) dusha qallafani uu keeno falgal (reaction) u dhexeeya kiimikooyinka (chemicals) madaxa shidaal-qabadka iyo kiimikada (chemical) dusha qallafan.



shidaal-qabad (safety matches)



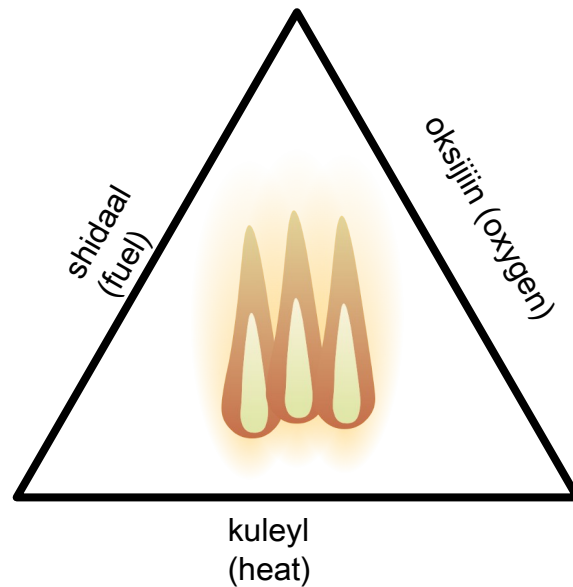
shidaal-qabad (safety matches) oo la xoqay

Saddex-xagalka dabka (fire triangle) waxaa loo isticmaalaa in lagu muujiyo waxyaabaha loo baahan yahay si gubashadu (combustion) u dhacdo:

- shidaal (fuel)
- oksijiin (oxygen)
- kulayl (heat)

Haddii mid ka mid ah 'dhinacyada' saddex-xagalka laga saaro:

- fal-galka gubashada (combustion reaction) wuu joogsan doonaa
- dabka / gubashadu way joogsan doontaa.



saddexagalka dabka (fire triangle)

Waa maxay saddexda shay ee loo baahan yahay si gubasho (combustion) u dhacdo?

a

olol, shidaal (fuel), oksijiin (oxygen)

b

olol, shidaal (fuel), carbon dioxide

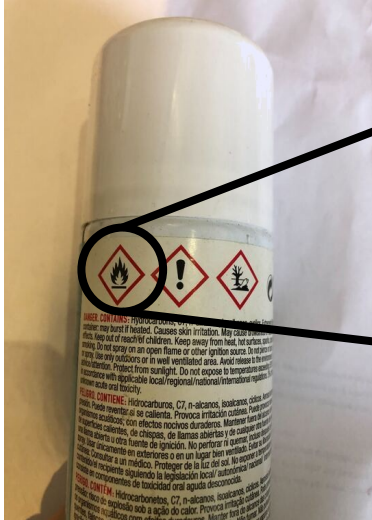
c

kuleyl (heat), oksijiin (oxygen), olol

d

kuleyl (heat), oksijiin (oxygen), shidaal (fuel) ✓

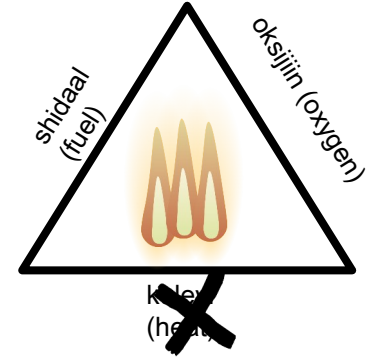
Walxaha (shidaalka) si fudud u qabsada dabka waxaa loo calaamadeeyaa inay yihiin kuwo ololi kara (flammable).



buufin biyaha ka ilaaliya
kabaha (trainer waterproofing
spray can)



calaamadda khatarta ee
ololka (flammable)

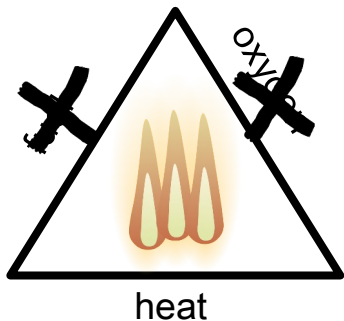


Tusaale ahaan, buufintan ka fogee kuleylka (heat) si aad uga
fogaato dab.

Calaamadaha khatarta waxay naga caawiyaan inaan nabadgelyo joogno adoo qaadaya
tallaabooyin ka hortagaya shilalka.

Qadarka kuleylka (heat) ee loo baahan yahay gubashada (combustion) wuu kala duwan yahay.

Magnesium wuxuu u baahan yahay kuleyl (heat) ka yimaada blow torch ama Bunsen burner si uu u bilaabo falgal (reaction) leh oksijiin (oxygen).



magnesium reacting with oxygen

Marka falgalku bilaabmo, wuxuu sii socdaa isagoon u baahnayn ilaha kulaylka bilowga ah.

Falgalku wuxuu joogsan doonaa marka 'shidaalka' ama ogsijiinta la isticmaalo.

Ogsijiinta loo baahan yahay falgal gubasho (combustion) had iyo jeer kama imaado hawada.



Tusaale ahaan, gantaallada waxay isticmaalaan kiimikooyin oksidayn (oxidising) si ay u bixiyaan ogsijiinta loo baahan yahay gubashada.

Calaamadaha khatarta waxaa loo isticmaalaa in lagu muujiyo walxaha bixin kara ogsijiin falgal.



hazard symbol
for oxidising

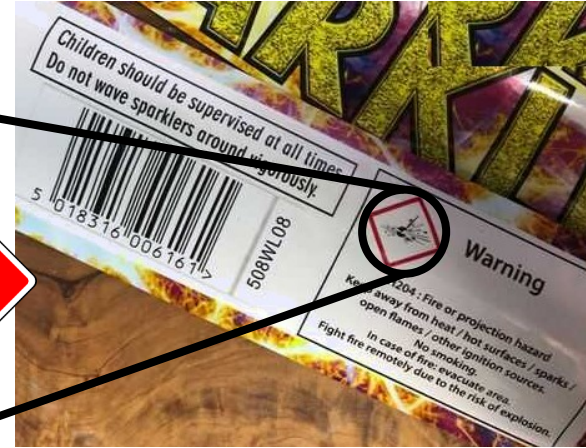
Qarax waa halka falgalka gubashadu uu si aad u degdeg ah u dhaco.



a sparkler burning



calaamadda khatarta
ee khatarta qaraxa



Run mise been?

Kulaylka ka yimaada blow torch ama Bunsen burner ayaa loo baahan yahay in lagu bilaabo dhammaan falgalka gubashada.



Run



Been



Sabab u sheeg jawaabtaada

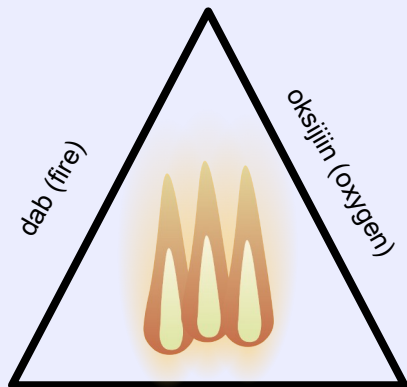
a

Falgalada qaarkood waxay dhacaan kaliya kulaylka isku dhaca, tusaale ahaan, ~~tarrakh~~.

b

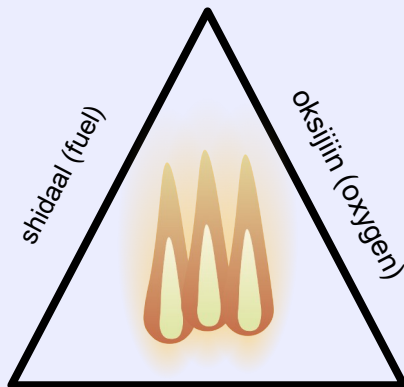
Fireworks had iyo jeer waxay u baahan yihiin in lagu shido Bunsen burner.

Waa kee sawirka saxda ah ee saddexagalka dabka (fire triangle)?



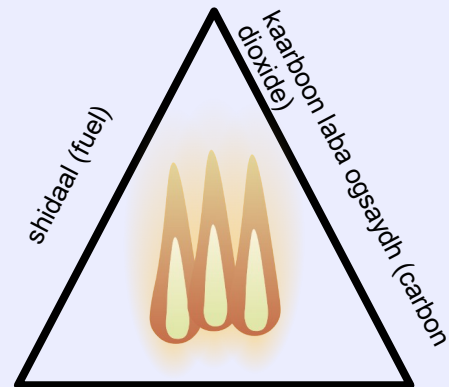
kulayl (heat)

a



kulayl (heat)

b

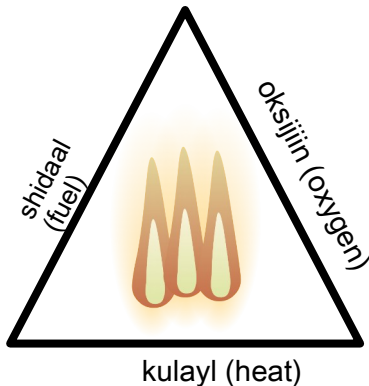


kulayl (heat)

c

Dab-demiyaasha waxay damiyaan dabka iyagoo ka saaraya mid ama in ka badan:

- shidaal (fuel)
- oksijiin (oxygen)
- kulayl (heat)

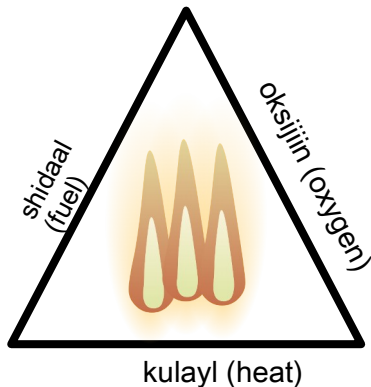


Tusaale ahaan, biyo (water) ku shubista dab:

- qaboojisaa shidaalka (fuel)
- ka saaraysaa kulaylka (heat) dabka.



Qaar ka mid ah dab-demiyaasha waxay damiyaan dabka iyagoo ka saaraya laba ama saddex 'dhinac' oo ka mid ah saddexagalka dabka (fire triangle):



Tusaale ahaan, dab-demiyaaha kaarboon laba-oksaydh (carbon dioxide extinguisher):

- wuxuu oksijiinta (oxygen) dabka ka saaraa
- wuxuu qaboojiyaa shidaalka (fuel) oo kulaylka (heat) dabka ka saaraa.



Saarista xumbo dabka batroolka:

- wuxuu daboolaa dareeraha gubanaya lakab xumbo ah, isagoo meesha ka saaraya sahayda oksijiinta (oxygen)
- wuxuu ka hortagaa sii daynta uumiga guban kara (shidaal/fuel)
- wuxuu qaboojiyaa shidaalka (fuel) oo kulaylka (heat) dabka ka saaraa.

Saarista biyaha (water) dabka waxay meesha ka saartaa ...

- a** kulaylka  (heat).
- b** oksijiinta (oxygen).
- c** shidaalka (fuel).

Gubasho iyo gubid (Burning and combustion)

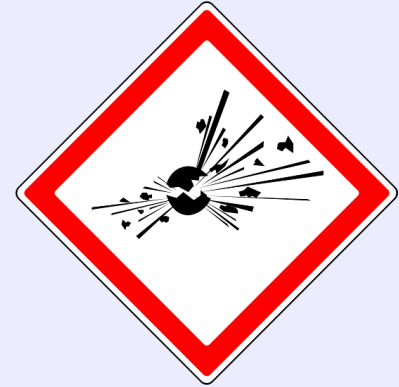
Waa summadee khatarta (hazard symbol) ee saxda ah oo la dhigi lahaa walaxda ilo oksijiin (oxygen) ah?



a



b



c

Naxaas-oksaydh (copper oxide) ma gubtaa? Sababaha ugu jawaabta.



a

b

c

waxaa loo baahan yahay macluumaad dheeri ah

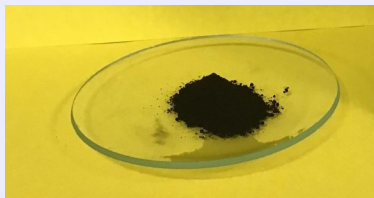
Jawaabaha:



- 1) Budadan madow waxay ka samaysan tahay kaarboon (carbon).
Kaarboon (carbon) waa uu gubi karaa.



Naxaas (Copper) waxay la falgashaa oksijiin (oxygen) si ay u samayso naxaas-oksaydh (copper oxide).
Budadan madow waa naxaas-oksaydh (copper oxide).



Jawaabaha:

haa maya

a

Naxaas-oksaydh (copper oxide) ma gubtaa? Sababaha ugu jawaabta.

a

b

c



macluumaad dheeri ah ayaa loo baahan yahay

Naxaas-oksaydh (copper oxide) ma gubto, sababtoo ah naxaasta (copper) horey ayay ula falgashatay oksijiin (oxygen).

- 2) Ardaydu waxay ka hadlayaan gubashada (combustion) iyo gubista (burning). Sheeg haddii weedhuhu ay yihiin kaliya gubis (burning), kaliya gubasho (combustion), ama labadaba.

Oolol (flames) lama arko.

Oolol (flames) waa la arkaa.

Waa falgal (reaction) la oksijiin (oxygen).

Waxyaabo aan ahayn oksaydh (oxide) mararka qaarkood waa la sameeyaa.

Oksaydh (oxide) had iyo jeer waa la soo saaraa.



Cabdi



Layla

2) Ardaydu waxay ka hadlayaan gubasho (combustion) iyo gubid (burning). Sheeg haddii weedhaha ay yihiin kaliya gubid (burning), kaliya gubasho (combustion), ama labadaba gubid iyo gubasho.

Olol (flames) lama arko.

Olol (flames) waa la arkaa.

Waa falgal (reaction) oksijiin (oxygen) la.

Wax soo saar (products) aan ahayn oksaydhyaasha (oxides) mararka qaarkood waa la sameeyaa.

Oksaydh (oxide) had iyo jeer waa la soo saaraa.



Cabdi



Layla

Jawaabaha:

labadaba

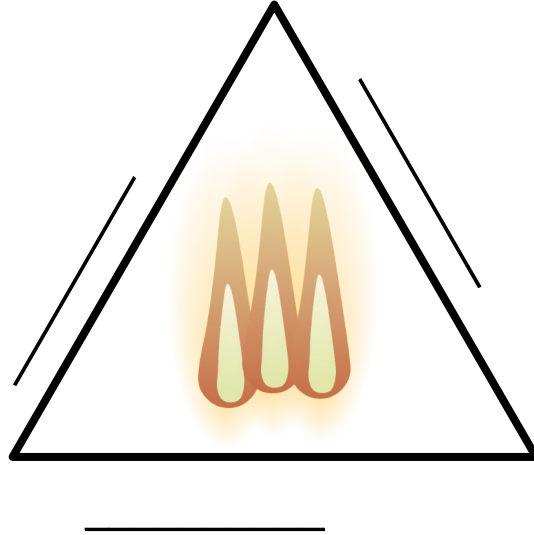
kaliya gubasho (combustion)

kaliya gubid (burning)

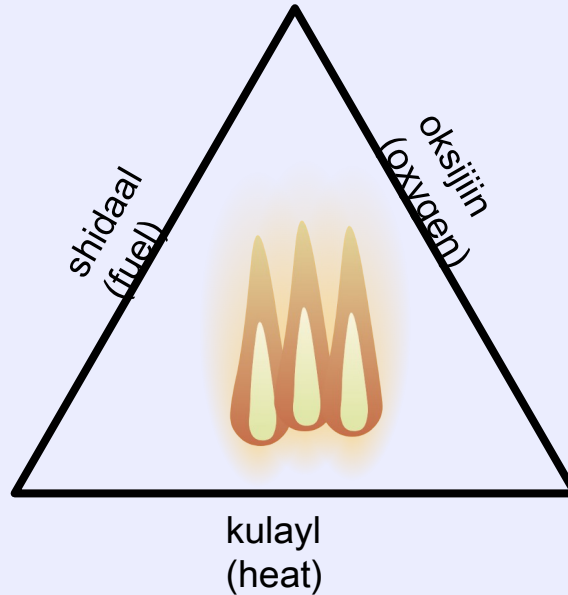
labadaba

labadaba

3) Ku calaamadee dhinacyada saddex-xagalka dabka (fire triangle).



3) Ku calaamadee dhinacyada saddex-xagalka dabka (fire triangle).



4) Ku xidh weedhaha ku saabsan dab-demisyada qaybta (qaybaha) saddexagalka dabka ee ay meesha ka saarayaan.

Dab-demis xumbo (foam) ahi wuxuu soo saaraa xumbo qaboojisa shidaalka (fuel) oo sameeya lakab sare oo dabka ah, sidoo kale wuxuu joojiyaa shidaalka (fuel) inuu sameeyo uumiga.

shidaal (fuel)

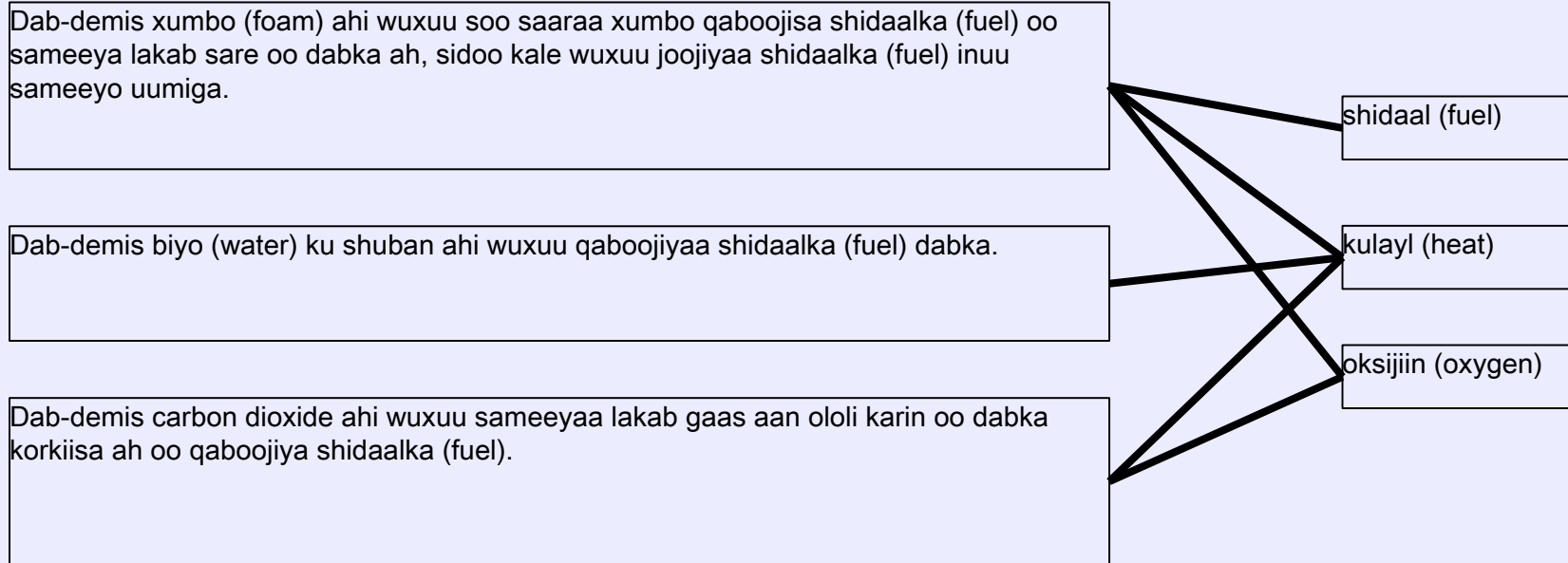
Dab-demis biyo (water) ku shuban ahi wuxuu qaboojiyaa shidaalka (fuel) dabka.

kulayl (heat)

Dab-demis carbon dioxide ahi wuxuu sameeyaa lakab gaas aan ololi karin oo dabka korkiisa ah oo qaboojiya shidaalka (fuel).

oksijiin (oxygen)

4) Ku xidh weedhaha ku saabsan dab-demisyada qaybta (qaybaha) saddexagalka dabka ee ay meesha ka saarayaan.



Falgal (reaction) kiimiko: ololid (combustion)



Gubasho iyo ololid (combustion)



Isla'egyada ololka (combustion equations)

Shidaal (fuel) badan waxay ka kooban yihiin carbon iyo hydrogen:

- waxay ka kooban yihiin oo kaliya atamka hydrogen iyo carbon
- kuwan waxaa loo yaqaan shidaalka hydrocarbon (hydrocarbon fuels)
- tusaale: methane, propane, petrol (badanaa octane).

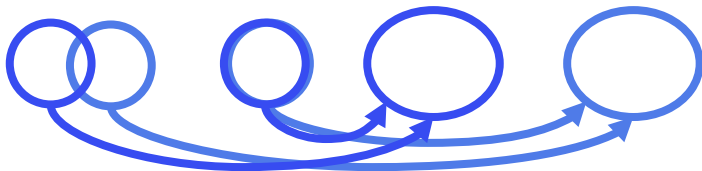
Isla'egta guud ee shidaalka (fuel) hydrocarbon gubanaya waa:

shidaalka hydrocarbon (hydrocarbon fuel) + oksijiin (oxygen) → carbon dioxide + biyo (water)

tusaale: ethane + oksijiin (oxygen) → carbon dioxide + biyo (water)

Biyo (Water) waxaa inta badan lagu sameeyaa falgal (reaction) kiimiko haddii atamka oksijiin (oxygen) iyo hydrogen ay joogaan.

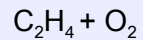
tusaale: Kuleyliyaha gaasta (gas boiler):
 $\text{methane} + \text{oksijiin (oxygen)} \rightarrow \text{carbon dioxide} + \text{biyo (water)}$



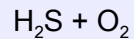
Carbon dioxide waxaa inta badan lagu sameeyaa falgal (reaction) kiimiko haddii atamka oksijiin (oxygen) iyo carbon ay joogaan.

Falgal (reaction) kee/kee ayaad filanaysaa inaad biyo (water) ku aragto badeecad ahaan?

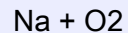
a



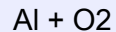
b



c



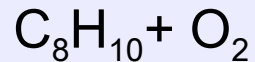
d



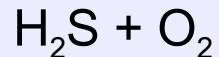
Isleegyada gubashada (Combustion equations)

Falgal (reaction) kee/kee ayaad filanaysaa inaad carbon dioxide ku aragto badeecad ahaan?

a



b



c

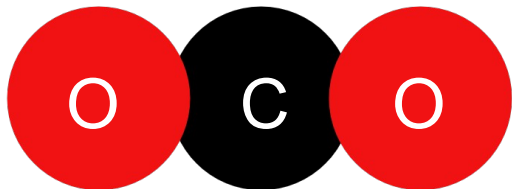


d

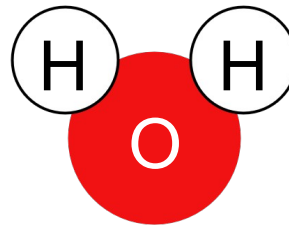


Carbon dioxide iyo biyo (water):

- waa unugyo yaryar (molecules)
- si fudud u samaysma
- waxay leeyihiin xiriir adag oo ka dhexeeya atomkooda.



unugga (molecule) carbon dioxide



unugga (molecule) biyo (water)

Isla'egyada gubashada (Combustion equations)



Raadi bayaanka saxda ah ee ku saabsan carbon dioxide iyo biyo (water).

a

Waxay leeyihiin xiriir adag oo ka dhexeeya atomkooda.



b

Waxay leeyihiin xiriir daciif ah oo ka dhexeeya atomkooda.

c

Waa unugyo (molecules) waaweyn oo adag inay samaysmaan.

d

Waa unugyo (molecules) yaryar oo fudud inay samaysmaan.



1) Isku xir bayaannada erayada muhiimka ah. Waxaad isticmaali kartaa erayada muhiimka ah in ka badan hal mar.

badanaa waxay ku samaysma falgal (reaction) kiimiko haddii atomka (atoms) oksijiin (oxygen) iyo hydrogen (hydrogen) ay joogaan

waxa uu samaysmaa marka walax ay falgasho (react) oksijiin (oxygen)

unug (molecule) yar, si fudud u samaysma, oo leh xiriir adag oo ka dhexeeya atomka

habka falgalka (reacting) oksijiin (oxygen)

inta badan waxa uu ku samaysmaa falgal (reaction) kiimiko haddii ay joogaan oksijiin (oxygen) iyo atomka kaarboon

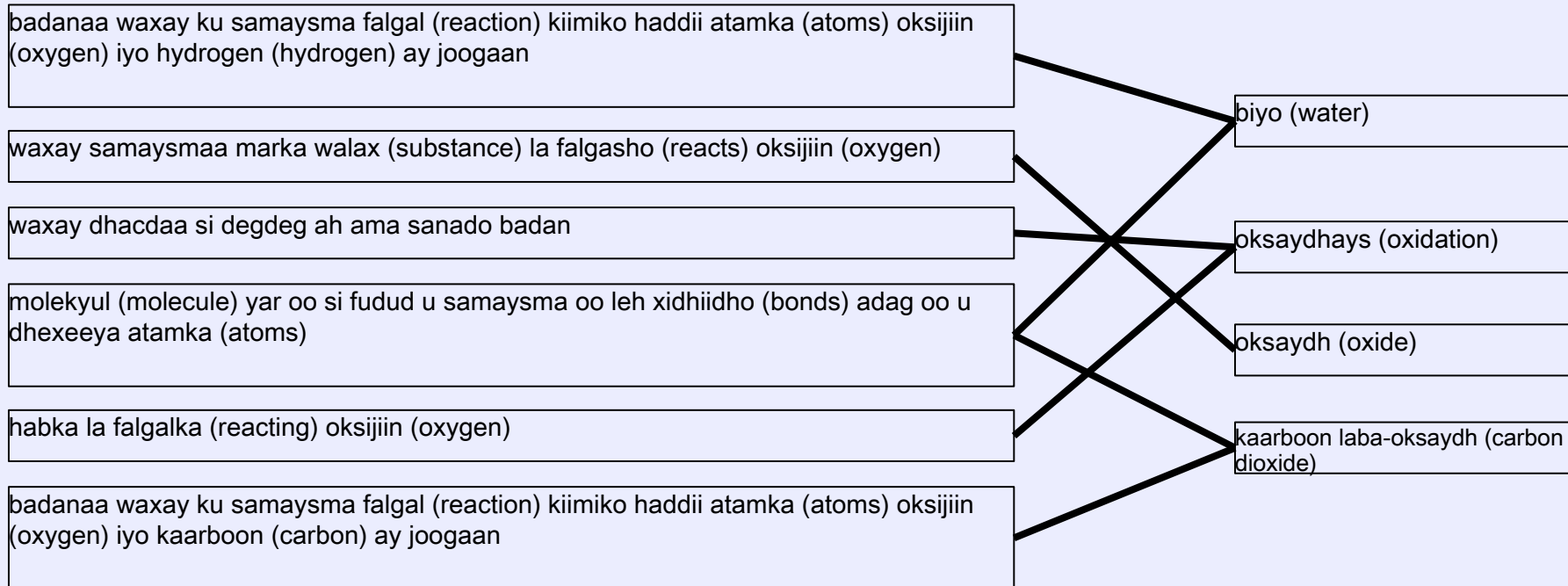
biyo (water)

oksaydhaysi (oxidation)

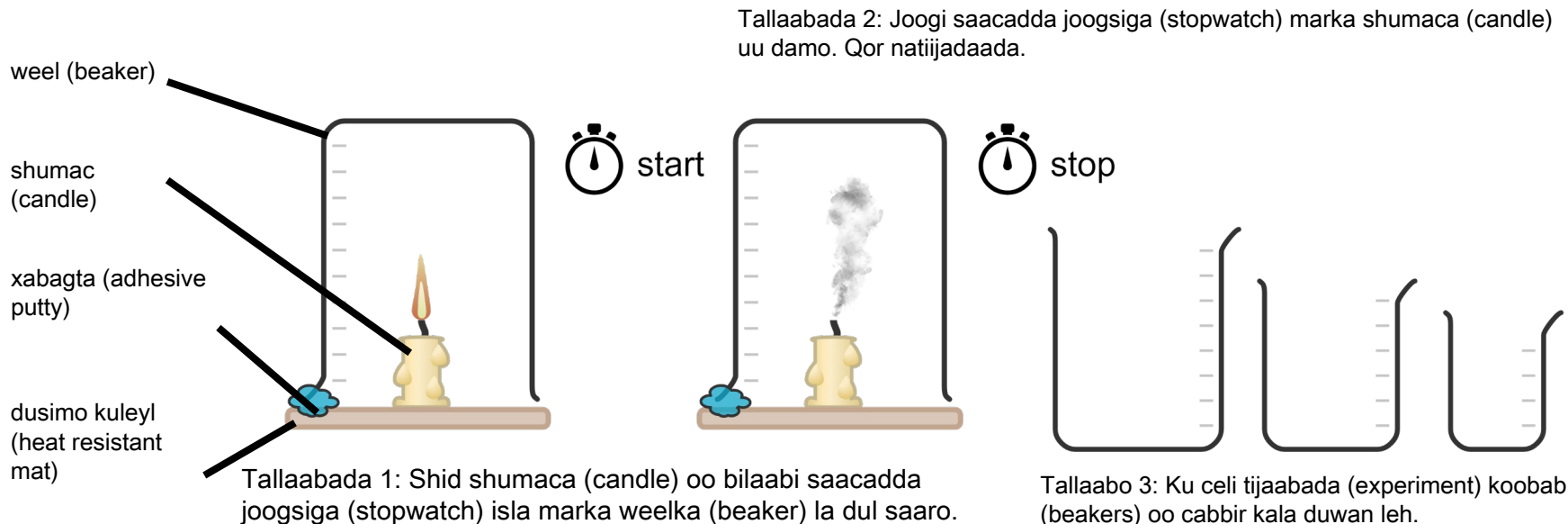
oksaydh (oxide)

carbon dioxide

1) Isku xidh weedhaha iyo erayada muhiimka ah. Waxaad u isticmaali kartaa erayada muhiimka ah in ka badan hal mar.



2) Samee tijaabo (experiment) si aad u baarto sida wakhtiga gubashada shumac (candle) uu isu beddelo mugga (volume) hawada / oksijiin (oxygen).



Kani waa miis natiiyo (results table) oo aad isticmaali karto.

cabbirka koobka (cm ³)	waqtiga ay qaadatay shumaca si uu u bakhti (s)

3) Qor gabagabo (conclusion) tijaabadaada.

Shumaca ugu dheer gubtay wuxuu ku jiray koobka _____
sababtoo ah ...

Shumaca wuu bakhtiyey markii ...

3) Qor gabagabo (conclusion) tijaabadaada.

Shumaca ugu dheer gubtay wuxuu ku jiray

ugu weyn / mug gaar ah oo la xuso, tusaale ahaan 1000 cm³

koobka sababtoo ah ...

waxaa jiray qiyaasta ugu badan ee oksijiin (oxygen) oo diyaar u ah shumaca inuu gubo.

Shumaca wuu bakhtiyey markii ...

dhammaan oksijiinka (oxygen) waa la isticmaalay falgalka (reaction) gubashada.

Soo koobid Falgal (reaction) kiimiko: gubasho (combustion)

Erayga 'gubasho' wuxuu qeexayaa falgalka (reaction) walxaha iyo oksijiin (oxygen), waxaana badanaa loo adeegsadaa in lagu tilmaamo lolka la arki karo.

Biyo (water) ayaa inta badan lagu sameeyaa falgal (reaction) kiimiko haddii ay jiraan atamka oksijiin (oxygen) iyo hydrogen.

Carbon dioxide ayaa inta badan lagu sameeyaa falgal (reaction) kiimiko haddii ay jiraan atamka oksijiin (oxygen) iyo carbon.

Carbon dioxide iyo biyo (water) labaduba waxay ka kooban yihiin molecules yaryar oo si fudud u sameeya xidhmo (bonds) adag.