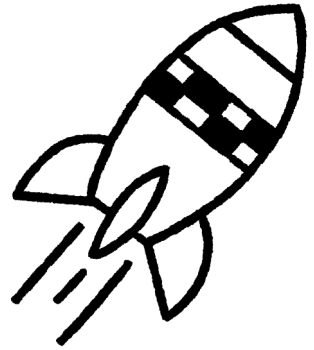


Midabka milicsiga (Reflecting colour)

Sayniska

Cutub: Samaynta sawirada (Making images)



Natiijo

Waxaan sharxi karaa midabka shayga iftiinka cad iyo iftiinka midabka leh.

Erayada muhiimka ah

milicsi (reflect)

in lagu dhaco dusha kana 'boodo'

ku dhaca (incident)

erey lagu qeexo iftiinka imanaya ee ku dhaca dusha

kala firdhi (scatter)

in iftiinka lagu milicsado jihooyin badan isku mar

unugyada koorta (cone cell)

unugyada gadaasha isha ee ogaada midabka

nuugid (absorb)

shay nuuga iftiinka / hela tamar iftiinka dhex mara, oo xaddiga iftiinka hoos u dhaca

Midabka milicsiga (Reflecting colour)



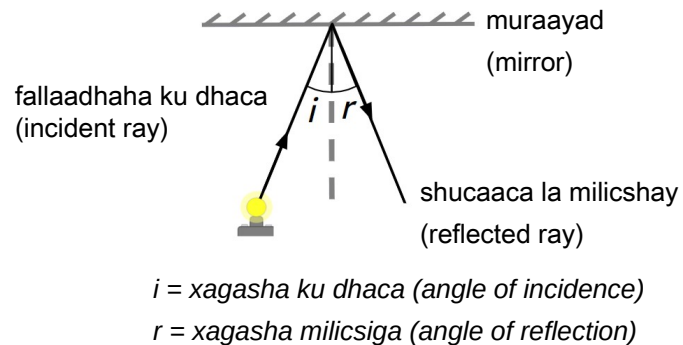
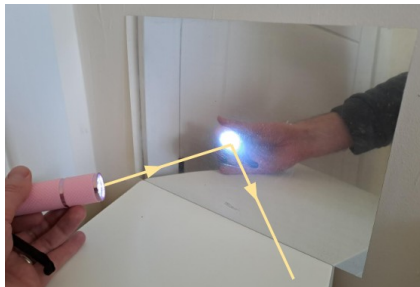
Aragtida shayga iftiinka cad



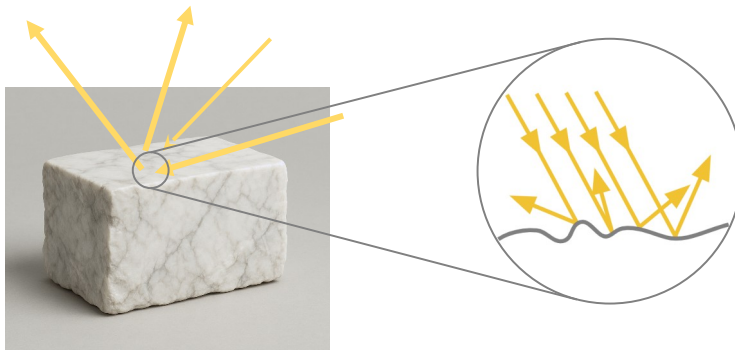
Aragtida shayga iftiinka midabka leh

Dhammaan dusha sare waxay milicsadaan iftiinka.

Muraayadaha (Mirrors) waxay ka milicsadaan shucaac kasta oo iftiin ah hal jiho, iyagoo u hogaansamaya sharciyada milicsiga (laws of reflection).



Dusha kale waxay kala firdhiyaan iftiinka, iyagoo milicsada jihooyin badan.



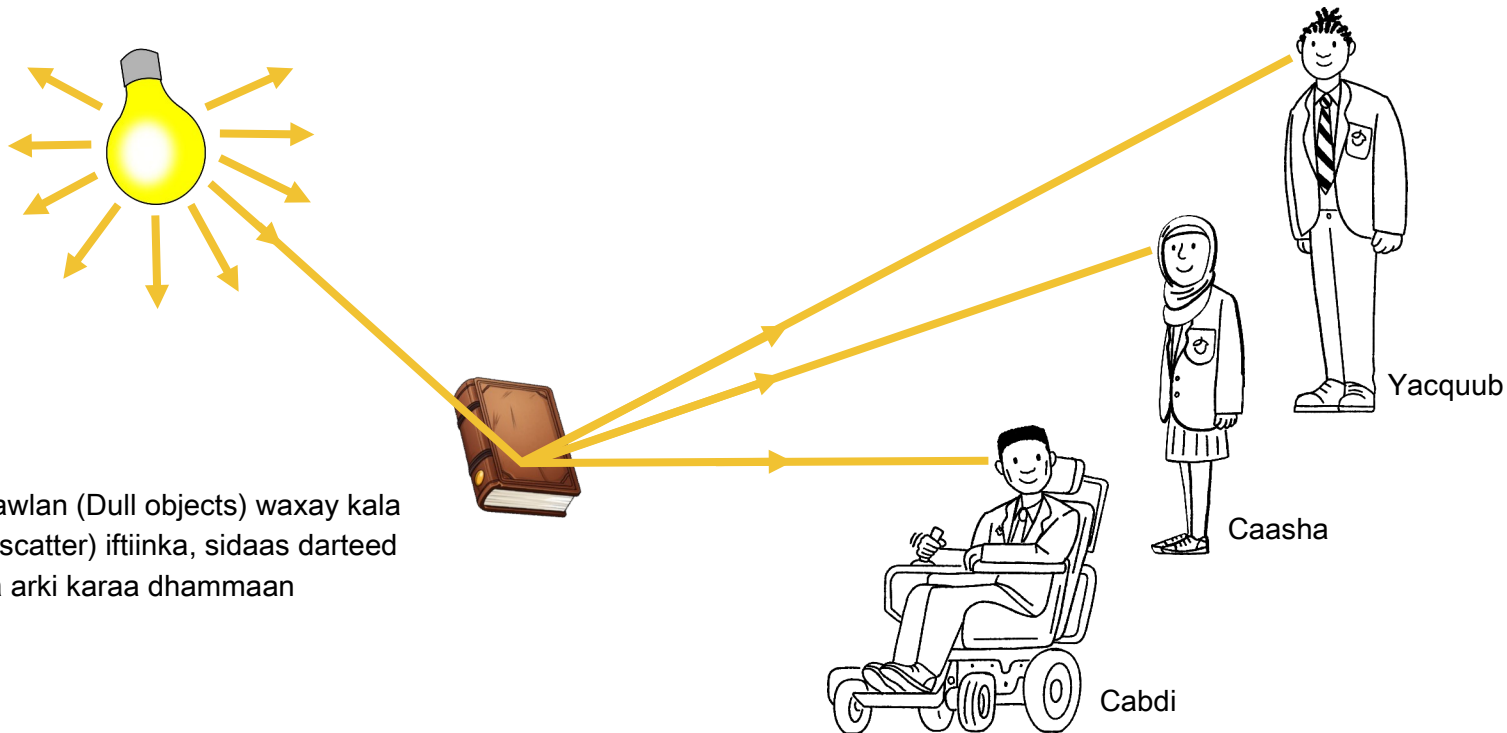
Waa maxay walxaha qolkan ku yaal ee iftiinka ka milicsada (reflect light)?

- | | |
|------------------------------|--|
| a muraayad (mirror) ✓ | e barkimaha fadhiga (sofa cushions) ✓ |
| b dhulka (floor) ✓ | f lugaha fadhiga (sofa legs) ✓ |
| c roogga (rug) ✓ | g gidaarada iyo saqafka (walls and ceiling) ✓ |
| d miiska (table) ✓ | h dhirta (plant) ✓ |

Dhammaan sagxadaha (surfaces) waxay ka milicsadaan iftiinka.



Waxaan aragnaa walxaha aan iftiin lahayn (non-luminous objects) marka qaar ka mid ah iftiinka ay ka milicsadaan uu galo indhahayaga.



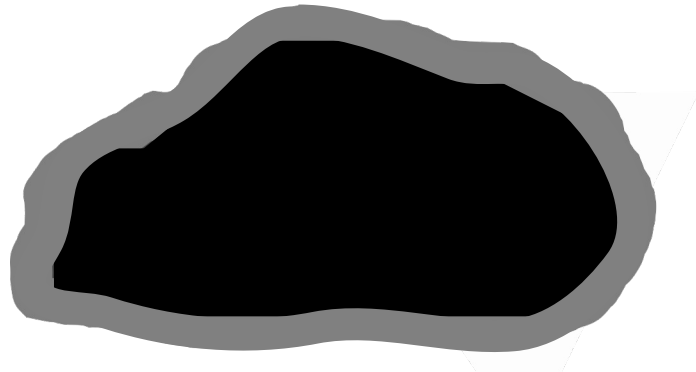
Walxaha cawlan (Dull objects) waxay kala firdhiyaan (scatter) iftiinka, sidaas darteed waxaa laga arki karaa dhammaan jihooyinka.

Aragtida walxaha iftiinka cad (white light)

Qiyaas inaad sahaminaysid god hoose oo dhulka hoostiisa ah.

Iftiinka kaliya waa kan ka imanaya tooshka madaxaaga.

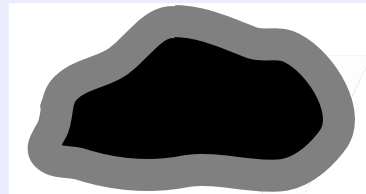
Haddii aad damiso, waxaad ku sugnaan doontaa mugdi buuxa. Ma awoodi doontid inaad waxba aragto. Indhahaagu weligood ma 'habboonaan doonaan'.



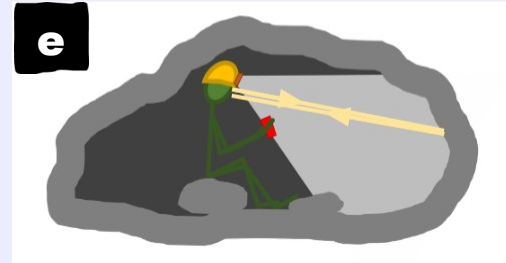
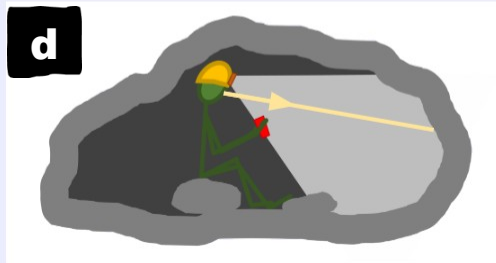
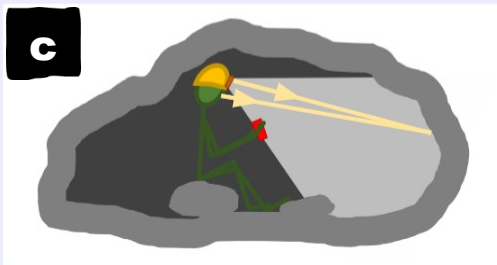
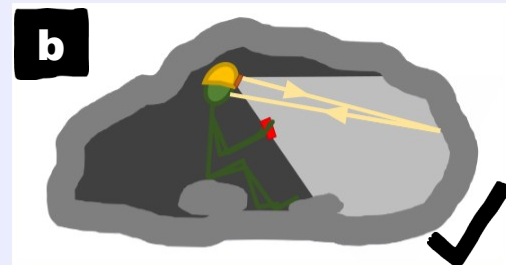
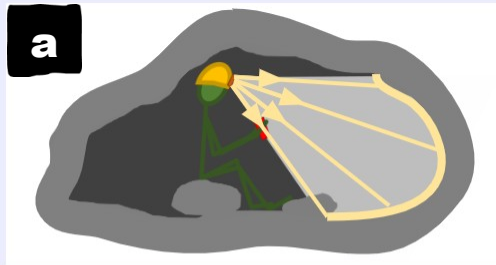
Taasi waa sababta oo aanay jirin iftiin haba yaraatee. Si aad u aragto, waa in iftiin ka soo milicsado dusha walxaha oo ku soo gaadho indhahaaga.

Aragtida walxaha iftiinka cad (white light)

Qof ku jira god hoose oo dhulka hoostiisa ah oo mugdi buuxa ku jira, ayaa dib u shida tooshka madaxa.



Jaantuskeebaa muujinaya sababta ay hadda u arki karaan gidaarka godka?

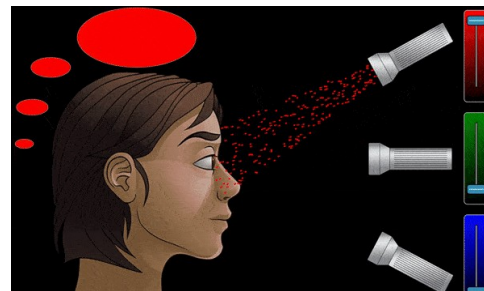
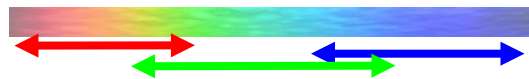
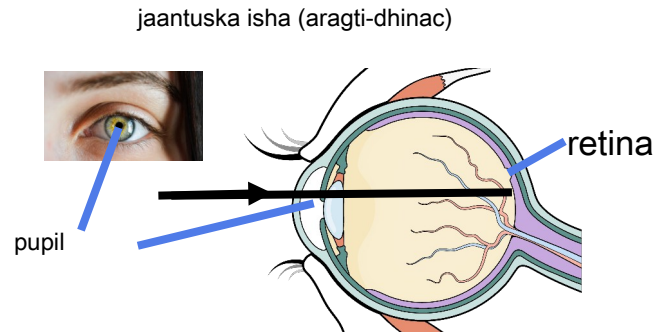


Waxaan u aragnaa midab marka iftiinka indhaha soo gala uu nuugo unugyada qaabka koofiyadda (cone cells) ee ku yaal retina.

Waxaa jira 3 nooc oo unug qaab koofiyad ah (cone cell). Nooc kastaa wuxuu nuugaa oo ogaadaa midab ka duwan: casaan (R), cagaar (G) ama buluug (B).

Marka midabka saxda ah uu ku dhaco unugga qaabka koofiyadda (cone cell), waxaa la diraa calaamad neerf oo koronto ah maskaxda.

Midabka aan aragno wuxuu ku xiran yahay heerarka calaamadaha R, G iyo B ee maskaxdu hesho.



Aragtida walxaha iftiinka cad (white light)

Qorraxda iyo laambadaha badankoodu waxay soo saaraan iftiin cad (white light).



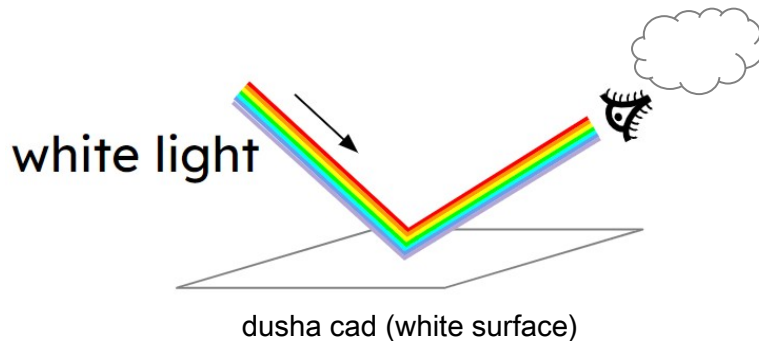
Iftiinkan cad (white light) wuxuu ka kooban yahay iftiin dhammaan midabada jeegaan (spectrum) ee la arki karo.

iftiinka qorraxda

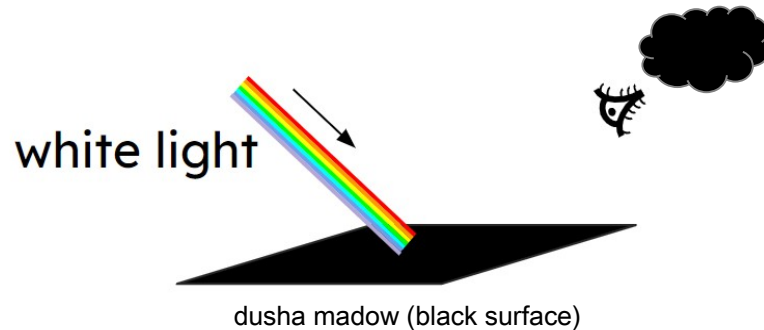


Marka uu indhaha soo galo, unugyada qaabka koofiyadda (cone cells) ee casaan, cagaar iyo buluug ah ayaa dhammaantood 'shida' isla waqti. Marka maskaxdu hesho saddexda calaamad oo wada jira, tani waxay keentaa inaan u aragno cad.

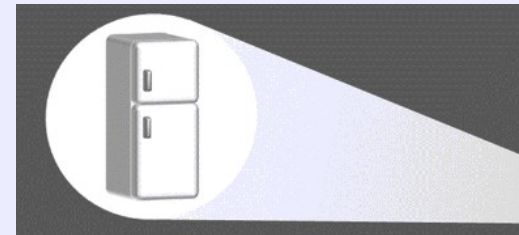
Dusha cad (white surfaces) waxay si siman u milicsadaan dhammaan midabada iftiinka. Iftiinka cad (white light), dhammaan midabada iftiinka ayaa indhahaaga ka soo gala dusha sare.



Dusha madow oo dhammaystiran (perfectly black surface) ma milicsan doonto iftiin gabi ahaanba. Iftiin kasta oo ku dhaca waa la nuugi doonaa (absorbed) oo iftiin kuma soo milicsan doono indhahaaga.



Maxay shayga cad (white objects) u ekaadaan cad (white) iftiinka cad (white light)?



a Shayga cad (white objects) had iyo jeer waxay u ekaadaan cad (white).

b Waxay kaliya milicsadaan hal midab oo iftiin ah (cad).

c Waxay milicsadaan dhammaan midabada jeegaan (spectrum).

d Ma milicsadaan midabada iftiinka midna.



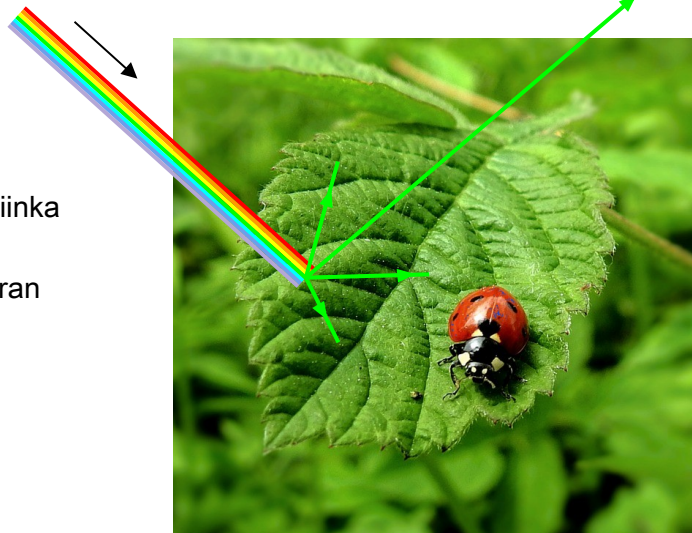
Midabka shaygu wuxuu ku xiran yahay midabada iftiinka uu milicsado.

Midabada iftiinka ee aan dusha milicsan waa la nuugaa (absorbed).

Shayga cagaaran (green objects) waxay kaliya milicsadaan iftiinka cagaaran (green light).

Waxay u ekaadaan cagaar (green) sababtoo ah iftiinka cagaaran (green light) oo keliya ayaa indhahaaga ka soo gala.

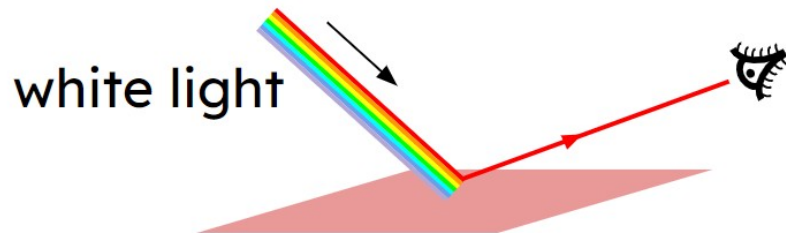
iftiin cad (white light)



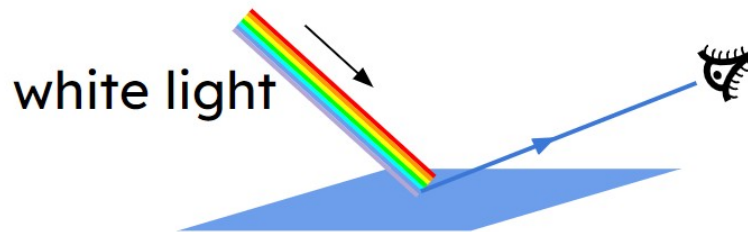
aragti (viewpoint)

Aragtida shayga iftiinka cad (white light)

Dusha cas waxay kaliya ka tarjumaysaa iftiinka cas.
Dhammaan midabada kale ee iftiinka waa la nuugaa.



Dusha buluugga ah (blue surfaces) waxay kaliya milicsadaan
iftiinka buluugga ah (blue light). Dhammaan midabada kale waa la
nuugaa (absorbed).



Run ama been?

Walxaha cagaaran waxay u eg yihiin cagaar sababtoo ah waxay kaliya nuugaan iftiinka cagaaran.



Run



Been



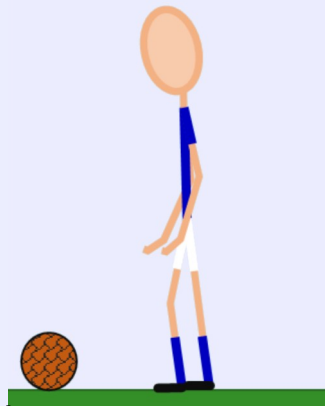
Sabab?

Walxaha cagaaran waxay u eg yihiin cagaar sababtoo ah waxay kaliya ka tarjumaan iftiinka cagaaran. Haddii shay uu nuugo iftiinka cagaaran, markaas iftiin cagaaran oo ka tarjumaya isaga indhahaaga ma gaari karo.

Qalabka kubbadda cagta ee kooxdu wuxuu leeyahay shaati buluug ah iyo surwaal cad.

Kee ka mid ah weedhahan soo socda ayaa sax ah?

- a** Shaatigu wuxuu ku darayaa midab buluug ah iftiinka qorraxda.
- b** Shaatigu wuxuu ka tarjumayaa iftiinka buluuga ah ee qorraxda. ✓
- c** Shaatigu wuxuu beddelaa midabka iftiinka qorraxda oo u rogaa buluug.
- d** Shaatigu wuxuu sii daayaa iftiin buluug ah.
- e** Surwaalku wuxuu ka tarjumayaa iftiinka buluuga ah ee qorraxda. ✓

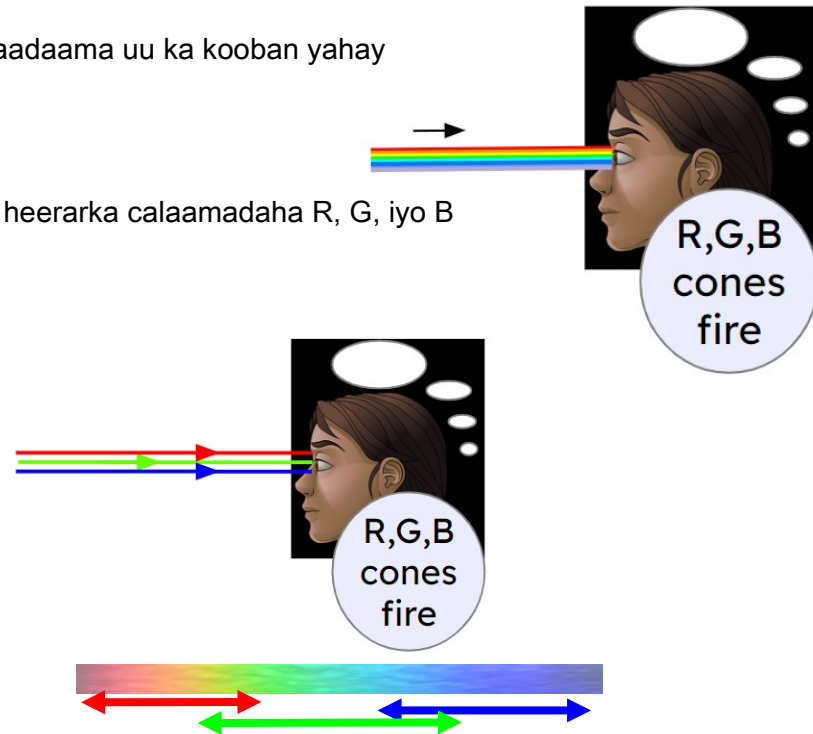


Iftiinka cad ee qorraxda iyo nalka waxaa loo matali karaa sidan oo kale maadaama uu ka kooban yahay dhammaan midabada jeegaan (spectrum).

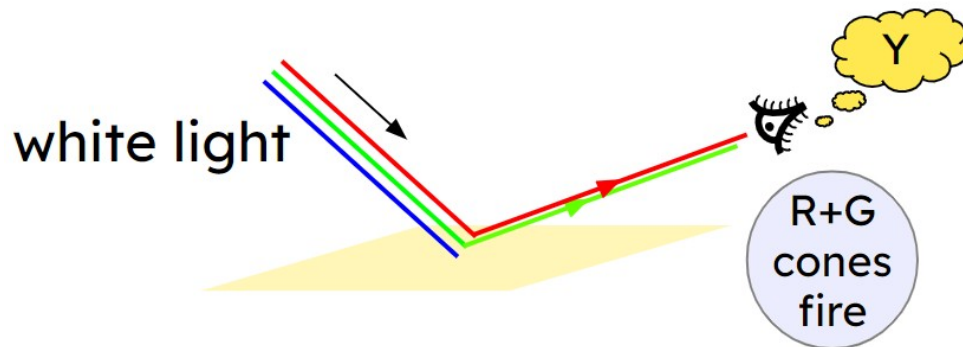
Si kastaba ha ahaatee, midab kasta oo aan aragno wuxuu ku xiran yahay heerarka calaamadaha R, G, iyo B ee maskaxdu hesho (oo ka imanaya unugyada koorta).

Sidaa darteed, iftiinka cad waxaa sidoo kale loo matali karaa iyadoo la isticmaalayo kaliya fallaadhaha cas, cagaar, iyo buluug.

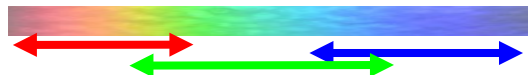
Saddexda fallaadhood waxay u taagan yihiin saddexda qaybood ee midabada iftiinka ee kiciya saddexda nooc ee unugyada koorta.



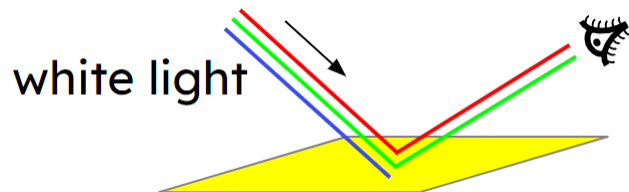
Isticmaalka qaabka 'RGB' ee iftiinka cad (white light), waxaynu niraahnaa dhammaan sagxadaha jaalle (yellow) ah waxay ka tarjumaan iftiinka guduudan (red) iyo iftiinka cagaaran (green), laakiin waxay nuugaan iftiinka buluugga ah (blue).



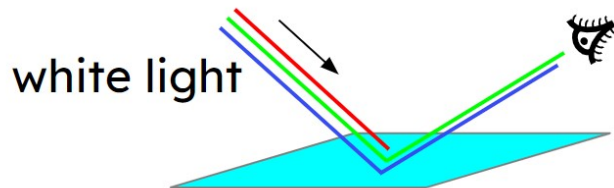
Tani runtii waxay ka dhigan tahay in sagxadaha jaalle (yellow) ah ay ka tarjumaan kaliya midabada iftiinka (colours of light) ee kiciya unugyada isha ee R iyo G, waxayna nuugaan midabada iftiinka ee kiciya unugyada isha ee B.



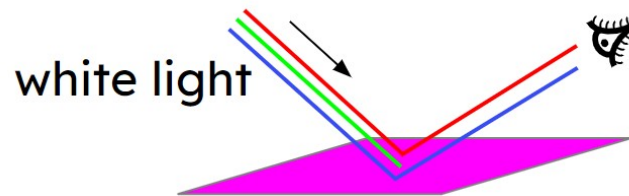
Sagxadaha jaalle (yellow) ah waxay si isku mid ah u tarjumaan iftiinka guduudan (red) iyo cagaaran (green) laakiin waxay nuugaan buluugga (blue).



Sagxadaha cyan (cyan) ah waxay si isku mid ah u tarjumaan iftiinka cagaaran (green) iyo buluugga (blue) laakiin waxay nuugaan guduudka (red).



Sagxadaha magentada (magenta) ah waxay si isku mid ah u tarjumaan iftiinka guduudan (red) iyo buluugga (blue) laakiin waxay nuugaan cagaarka (green).



Maxay shay u ekaadaa magenta (magenta) marka uu iftiin cad (white light) ku jiro?

a Wuxuu nuugaa iftiinka guduudan (red) iyo buluugga (blue) ee iftiinka cad (white light).

b Wuxuu nuugaa iftiinka oo waxaa dhaca falgal (reaction).

c Wuxuu ku daraa guduud (red) iyo buluug (blue) iftiinka cad (white light) ee ka tarjuma shayga.

d Wuxuu ka tarjumaa kaliya iftiinka guduudan (red) iyo buluugga (blue) ee iftiinka cad (white light).



e Iftiinka indhahaaga ayaa isu beddela guduud (red) iyo buluug (blue) marka uu taabto shayga.

Guyana waa waddan ku yaal Koonfurta Ameerika.

Kani waa calanka Guyana.



Calanku wuxuu duulayaa bannaanka maalin qorrax leh.

Sharax sababta qayb kasta oo calanka ugu ekaato midabka ay u ekaato (iftiinka qorraxda).

- saddex-xagalka guduudan (red triangle)
- xadka madow (black border)
- jeegaan (chevron) huruudka ah
- xadka cad (white border)
- asalka cagaaran (green background)

Ku bilow sharaxaadaada adigoo dhammaystiraya jumladahan:

Iftiinka qorraxdu waa ...

Saddexagalka cas wuxuu u eg yahay cas sababtoo ah ...



Sharax sababta qayb kasta oo calanka ugu egtahay midabkeeda (iftiinka qorraxda).

Fikradaha aad ku dari kartay:

- Iftiinka qorraxdu waa isku darka dhammaan midabada iftiinka ee jeegaan (spectrum) la arki karo.

- Saddexagalka cas wuxuu u eg yahay cas sababtoo ah wuxuu kaliya ka tarjumaa iftiin cas indhahaaga.
- Xadka madow wuxuu u eg yahay madow sababtoo ah ma tarjumayo iftiin indhahaaga.
- Jeegaanka (chevron) huruudka ah wuxuu u eg yahay huruud sababtoo ah wuxuu kaliya ka tarjumaa iftiin cas iyo cagaar indhahaaga (wuxuuna nuugaa buluug).
- Xadka cad wuxuu u eg yahay cad sababtoo ah wuxuu ka tarjumaa dhammaan midabada iftiinka indhahaaga.
- Asalka cagaaran wuxuu kaliya ka tarjumaa iftiin cagaar indhahaaga.

Tarjumaadda midabka (Reflecting colour)



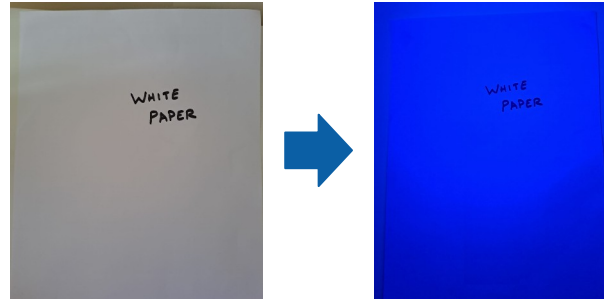
Aragtida walxaha iftiinka cad (white light)



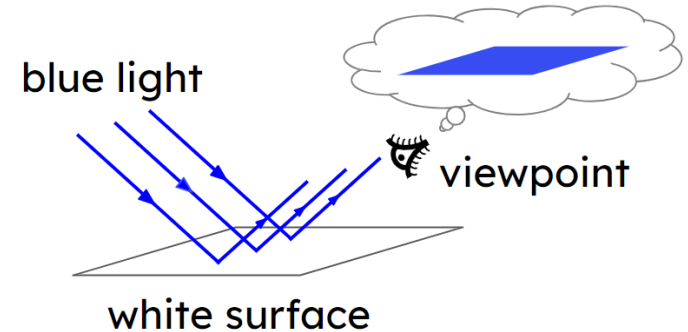
Aragtida walxaha iftiinka midabka leh (coloured light)

Aragtida walxaha iftiinka midabka leh (coloured light)

Iftiinka buluuga ah, dusha cad waxay u egtahay buluug.



Taas waxaa ugu wacan in dusha cad ay ka tarjumi karto dhammaan midabada iftiinka, laakiin waxaa jira iftiin buluug ah oo ku dhaca. Marka waxay kaliya ka tarjumaysaa iftiin buluug indhahaaga.

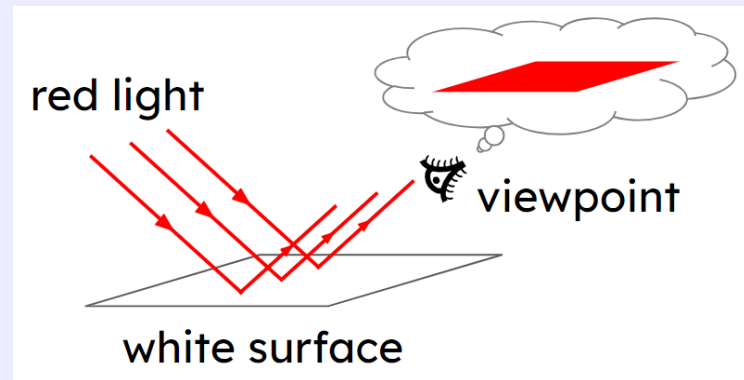


Qaybaha madow ee dusha waxay nuugaan dhammaan midabada iftiinka. Marka waxay weli u eg yihiin madow iftiinka midabka leh.

Midabkee ayay u ekaan doontaa dusha cad xaalad kasta?

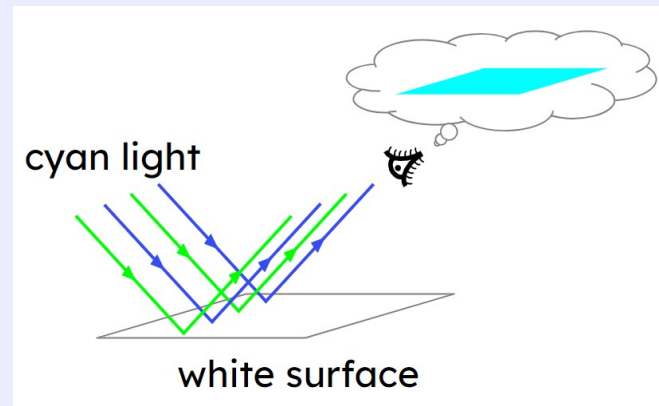
1) Iftiin cas (red light) ah?

cas
(red)



2) Iftiin cyan (cyan light) ah?

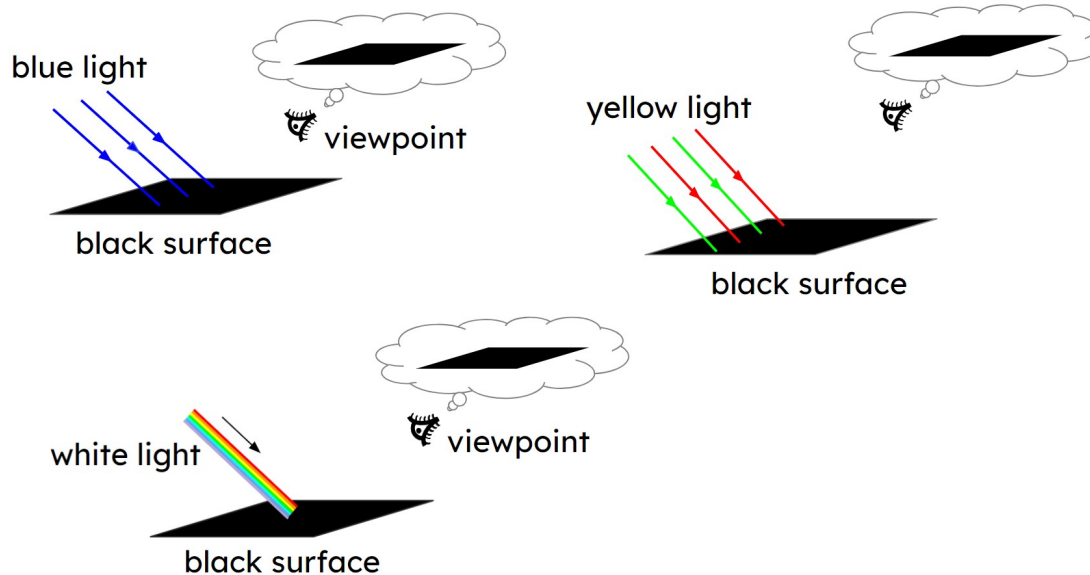
cyan



Aragtida shay ee iftiinka midabka leh

Dusha madow oo dhammaystiran waxay si buuxda u nuugtaa dhammaan midabada iftiinka ku dhaca.

Waxay u ekaan doontaa madow midab kasta oo iftiin ah.

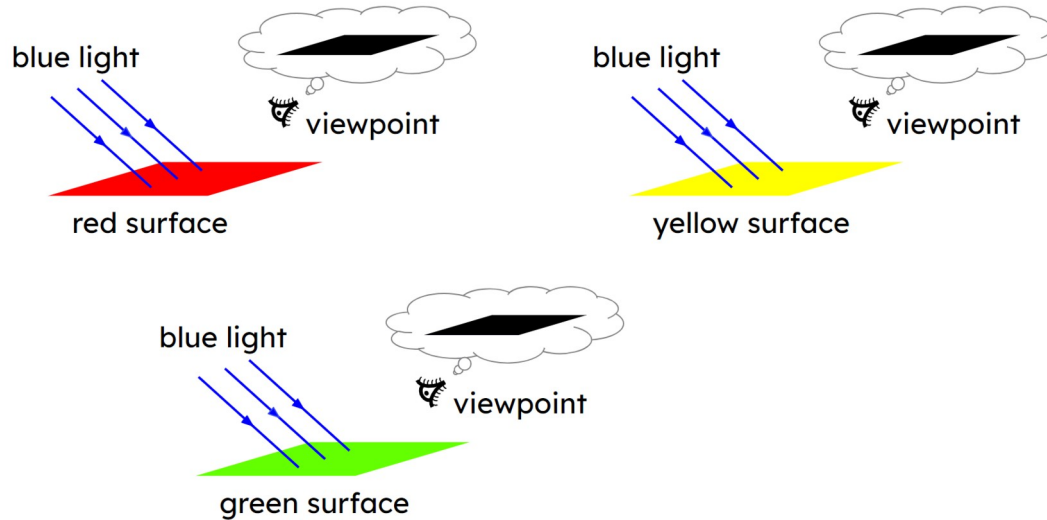


Aragtida shay ee iftiinka midabka leh

Iftiin buluug (blue light) ah, shayda cas (red), cagaar (green) iyo jaalle (yellow) dhamaantood waxay u ekaan doonaan madow.

Sababtoo ah dhamaantood waxay nuugaan iftiinka buluugga ah (blue light).

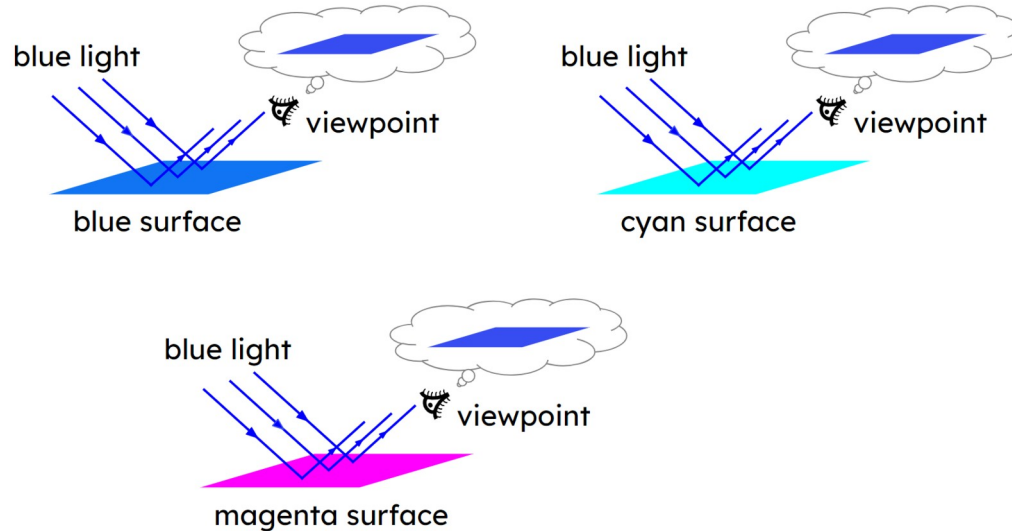
Waxay kaliya ka tarxi karaan iftiin cas (red), cagaar (green), ama iftiin cas iyo cagaar (red and green light).



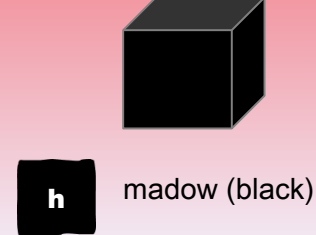
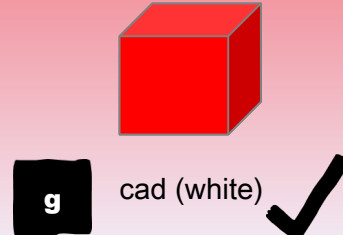
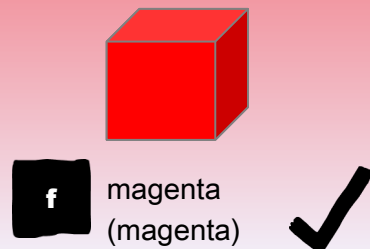
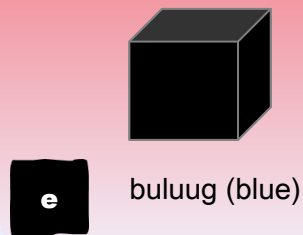
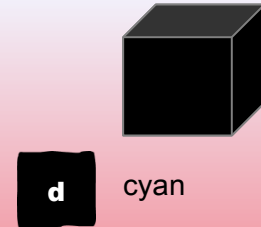
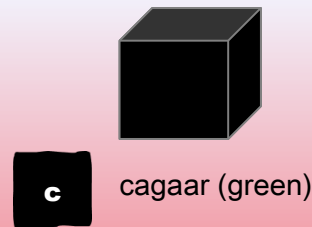
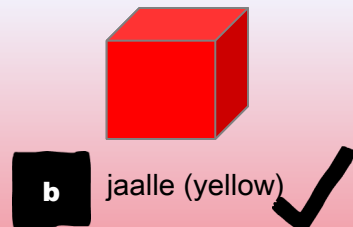
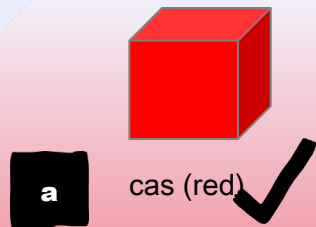
Aragtida shay ee iftiinka midabka leh

Iftiin buluug (blue light) ah, shayda buluug (blue), cyan ama magenta dhamaantood waxay u ekaan doonaan buluug (blue).

Sababtoo ah dhamaantood waxay ka tarxiyaan iftiinka buluugga ah (blue light), oo ma jiro midab kale oo iftiin ah oo ay ka tarxi karaan.

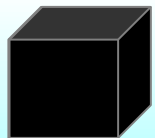


1) Cube-yada (cubes) kee ayaa u ekaan doona cas (red) haddii iftiin cas (red light) kaliya ku dhaco?

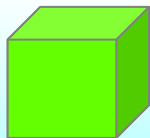


2) Waa maxay midabka ay kuwa kale ee dhamaan cubes-ku u ekaan doonaan iftiinka cas (red light)? madow (black) ✓

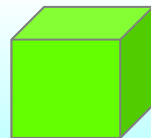
Iftiinka cyan (cyan light) wuxuu ka kooban yahay iftiinka cagaaran iyo iftiinka buluugga ah. Iftiinka cyan (cyan light) dhexdiisa ...



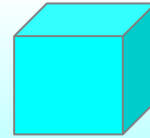
cas (red)



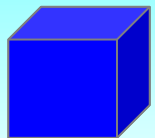
jaalle (yellow)



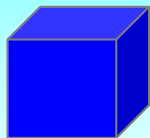
cagaar (green)



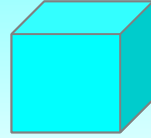
cyan (cyan)



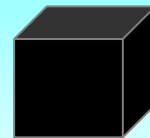
buluug (blue)



magenta
(magenta)



cad (white)



madow (black)

... cubes-ka kuwa ka tarjumaya iftiinka cagaaran iyo iftiinka buluugga ah labadaba waxay u ekaan doonaan cyan (cyan).

... cubes-ka kuwa ka tarjumaya buluug laakiin aan cagaar ahayn waxay u ekaan doonaan buluug (blue).

... cubes-ka kuwa ka tarjumaya cagaar laakiin aan buluug ahayn waxay u ekaan doonaan cagaar (green).

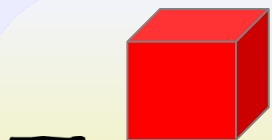
... cubes-ka kuwa aan ka tarjumin buluug ama cagaar midna waxay u ekaan doonaan madow (black).

Aragtida walxaha iftiinka midabka leh

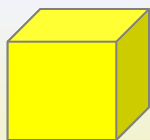


Hubi

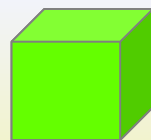
Iftiinka jaalle (yellow light) wuxuu ka kooban yahay iftiinka cas iyo iftiinka cagaaran.
Sheeg midabka ay u muuqato cube kasta iftiin jaalle (yellow light) ah.



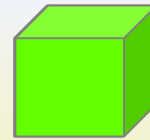
a



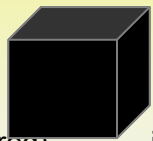
b



c

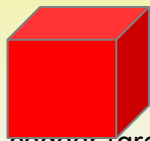


d



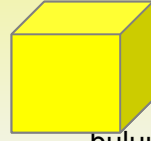
guduud (red)

jaalle (yellow)



cagaar (green)

cyan



buluug (blue)



magenta

e

guduud (red)

jaalle (yellow)

f

g

h

Jawaabaha:

- 1) Saadaali midabka uu u muuqan doono qayb kasta oo ka mid ah calanka Guyana marka la eego iftiin cagaar (green light) ah.
- 2) Sharax sababta aad u malaynayso inaad arki doonto tan.

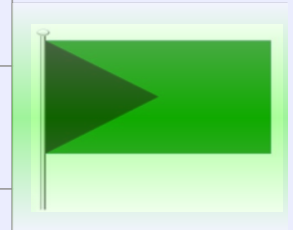
qayb ka mid ah calanka	saadaal	sharaxaad
saddexagal cas		
xuduud madow		
chevron jaalle		
xuduud cad		
asal cagaar		



- 3) Daawo tusaale (demonstration).
- 4) Saadaalintii iyo sharaxaadii ma sax ahayd?
Qor sharaxaado (explanations) la hagaajiyay oo ku saabsan waxa aad aragtay inay dhaceen.

Saadaasha iyo sharaxaadda moodeelka.

qayb ka mid ah calanka	saadaal	sharaxaad
saddexagal cas	madow	Wuxuu ka tarjumaa kaliya iftiinka cas wuxuuna nuugaa midabada kale. Iftiinka cagaaran waa la nuugay sidaas darteed wuxuu u ekaanayaa madow.
xuduud madow	madow	Madow ma tarjumayo midab kasta oo iftiin ah.
chevron jaalle	cagaar	Jaalle (Yellow) wuxuu ka tarjumaa iftiinka guduudan (red) iyo cagaaran (green), laakiin ma jiro iftiin guduudan (red) oo la tarjumo.
xuduud cad (white border)	cagaar (green)	Wuxuu ka tarjumaa dhammaan midabada (colours) iftiinka, sidaas darteed wuxuu ka tarjumaa iftiinka cagaaran (green) oo wuxuu u muuqdaa cagaar (green).
asalka cagaaran (green background)	cagaar (green)	Wuxuu ka tarjumaa iftiinka cagaaran (green) ee soo gaaray (incident).



Waxaan aragnaa midab (colour) marka iftiinka (light) soo galaya indhahayaga uu nuugo (absorbed) unugyada (cells) qaabaysan (cone) ee guduudan (red), cagaaran (green) iyo buluug (blue) oo ku yaal gadaasha indhahayaga.

Midabka (colour) uu shay (object) noogu muuqdo wuxuu ku xiran yahay xaddiga (amounts) iftiinka guduudan (red), cagaaran (green) iyo buluug (blue) ee ka soo tarjumaya (reflect) isaga oo soo galaya indhahayaga.

Walxaha cad (White objects) waxay ka tarjumaan dhammaan midabada (colours) iftiinka, sidaas darteed waxay u muuqdaan isku midab (same colour) sida iftiinka (light) ee soo gaaray (incident).

Walxaha guduudan (red), cagaaran (green) iyo buluug (blue) waxay ka tarjumaan (reflect) kaliya hal midab (primary colour) oo iftiin (light) ah. Walxaha Cyan, Magenta iyo Jaalle (yellow) waxay ka tarjumaan (reflect) laba midab (primary colours) oo iftiin (light) ah.

Midabada (colours) iftiinka (light) ee uu shay (object) aanu ka tarjumin (reflect) waa la nuugaa (absorbed).

Walxaha madow (Black objects) waxay nuugaan (absorb) dhammaan midabada (colours) iftiinka (light).