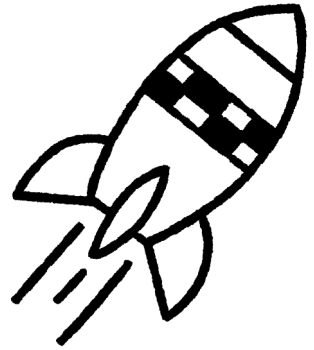


Milicsiga muraayadaha (Reflections in mirrors)

Sayniska

Cutub: Dhawaaqa, iftiinka iyo aragga (Sound, light and vision)



Natiijo

Waxaan sharxi karaa sababta milicsiga (reflections) (sawirada) looga arko muraayadaha iyo sifooyinka sawirada muraayadaha.

Erayada muhiimka ah

milicsi (reflection)

ereygaani wuxuu leeyahay labo macne:

1. habka iftiinka uu 'ka boodo' dusha
2. sawir lagu arko muraayad

sawir (image)

matalaad shay

dhinac rogan (laterally inverted)

qeexaysa sawir 'la rogay' si toosan

sawir
(image):



sawir dhinac rogan
(laterally inverted
image):



Milicsiga muraayadaha (Reflections in mirrors)



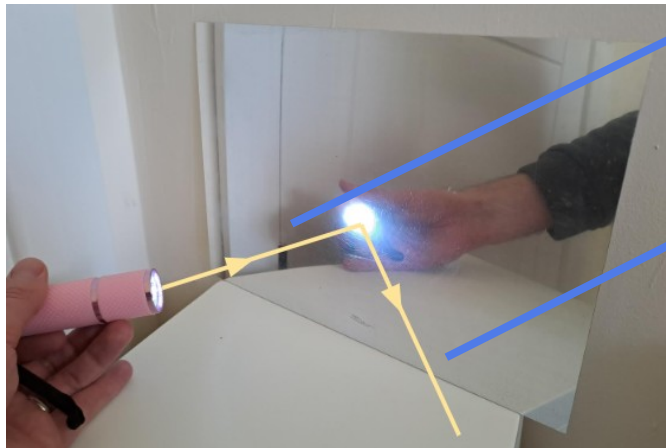
Baaritaanka sawirada muraayadaha



Gunaanad

Iftiinka waxaa ka soo baxa shay ifaya dhammaan jihooyinka. Iftiinku wuxuu ku socdaa xariiq toosan, xawaare aad u sareeya.

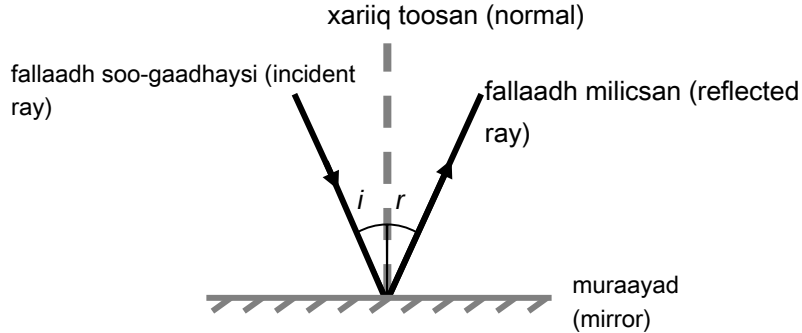
Haddii iftiinku ku dhaco muraayad, wuu milicsadaa ('ka boodaa'). Iftiinka ku socda hal jiho (hal iftiin ray) kaliya wuxuu ka milicsadaa hal jiho.



Raygani wuxuu muujinayaa jihooyinka qaar ka mid ah iftiinka ka baxaya tooshka.

Fallaadhkani wuxuu muujinayaa jihada iftiinka ka dib marka uu ka milicsaday muraayadda (mirror).

Lftiinka ku dhaca muraayadda (mirror) had iyo jeer wuu milicsadaa isagoo raacaya sharciyada milicsiga (laws of reflection).



'Xariiqda toosan (normal)' waa xariiq mala-awaal ah oo laga soo dhigay 90° ilaa barta milicsiga (point of reflection).

i = xagasha soo-gaadhista (angle of incidence)

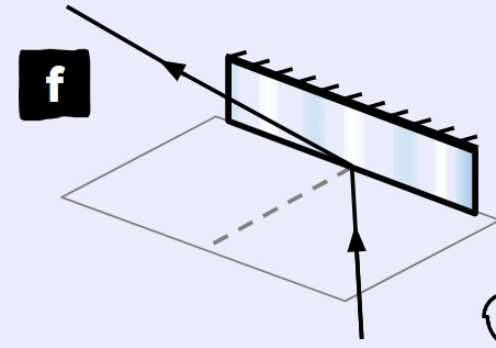
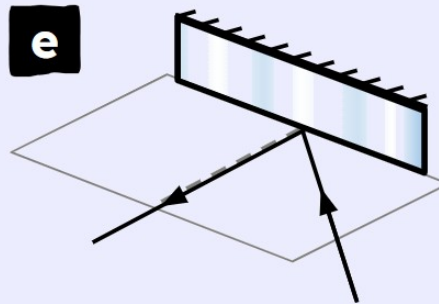
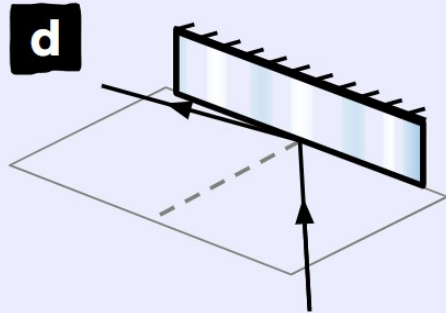
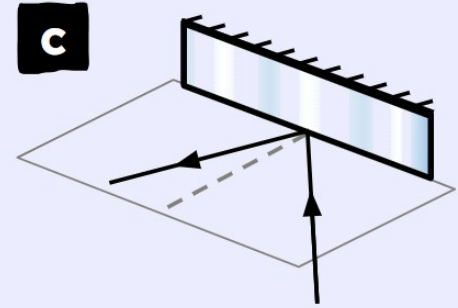
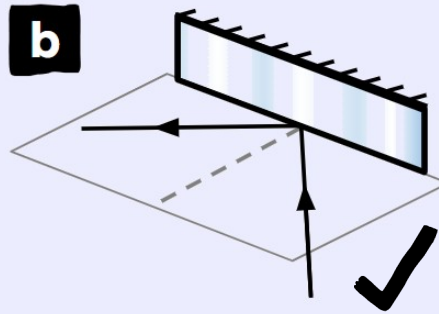
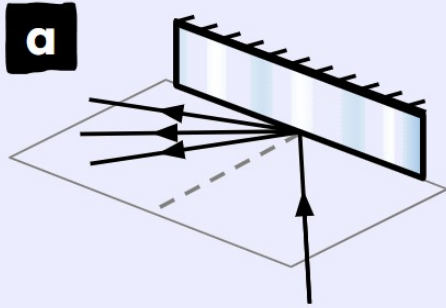
r = xagasha milicsiga (angle of reflection)

(loo qiyaasay xariiqda toosan (normal))

Xagasha milicsiga (angle of reflection) had iyo jeer waxay la mid tahay xagasha soo-gaadhista (angle of incidence), dhinaca kale ee xariiqda toosan (normal), iyo isla diyaaradda (same plane).

Baaritaanka sawirada muraayadda (mirror)

Jaantuskee ayaa si sax ah u muujinaya fallaadh ka milicsanaysa muraayadda (mirror)?

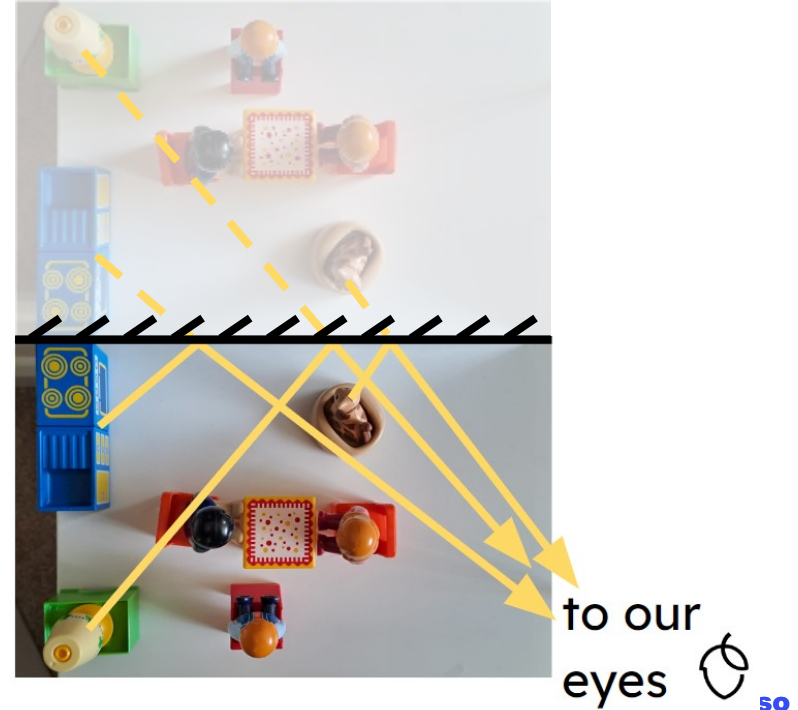




Sawirka lagu arko muraayadda (mirror) sidoo kale waxaa loo yaqaan milicsi (reflection).

Walxaha qolka ku jira waxay iftiin ka milicsadaan dusha muraayadda (mirror). Kadibna muraayaddu (mirror) waxay qaar ka mid ah fallaadhahan u milicsataa indhahayaga.

Indhahayagu waxay 'dib u raacaan' halka ay fallaadhaha ka soo baxeen dusha muraayadda (mirror surface). Tani waa waxa abuura milicsiga (reflection).



Midkee ka mid ah kuwan soo socda ayaa sababa sawirada lagu arko muraayadda (mirror)?

a

Iftiinka qolka ayaa ka milicsada muraayadda (mirror).



b

Iftiinku wuxuu galaa muraayadda (mirror).

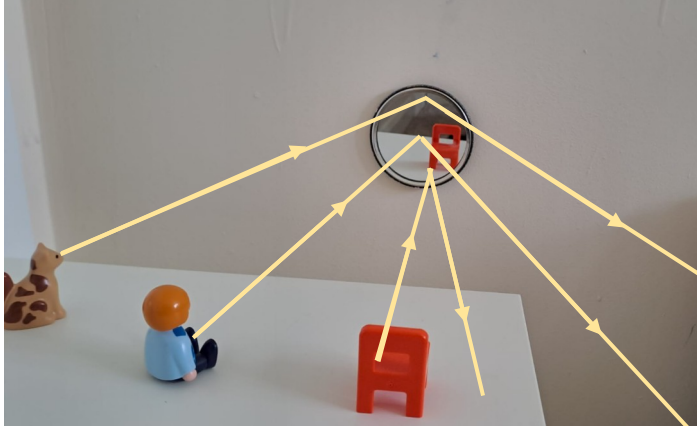
c

Muraayaduhu waxay sameeyaan nuqul (copy) wax kasta oo hortooda ku yaal.

d

Muraayaduhu waxay abuuraan iftiin (light) si ay u sameeyaan sawirka (image).

Waxa aad ku aragto muraayad waxay ku xiran tahay booskaaga.



Booskan waxaan ku arki karnaa milicsiga (reflection) kursiga.

Si aan u aragno milicsiga (reflection) bisadda waa inaan halkan joognaa.



Si aan u aragno milicsiga (reflection) ilmaha waa inaan halkan joognaa.



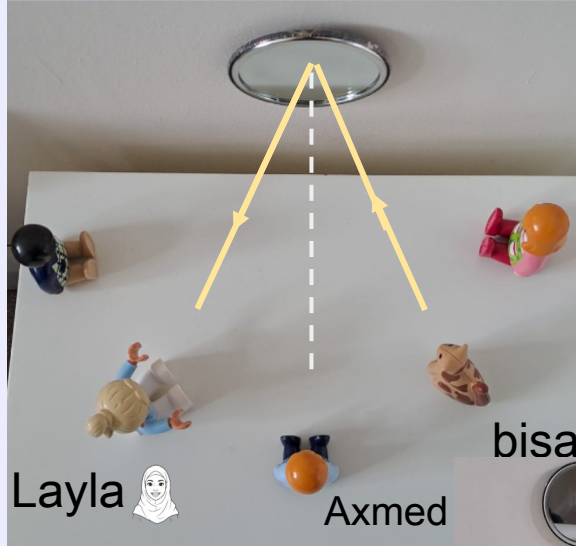
Dadka boosaska kala duwan ku jira waxay arki doonaan sawiro (images) kala duwan isla muraayadda isla waqtigaas.

Baaritaanka sawirada muraayadda (mirror images)

Yaa arki kara milicsiga (reflection) bisadda ee muraayadda?



Cali



Suad



bisad



Layla



Axmed

Baaritaanka sawirada muraayadda (mirror images)



Sharaxaad

Sawirka (image) muraayadda waa mid rogan (laterally inverted) marka loo barbardhigo shayga marka uu soo jeedo.

Furaha (spanner) wuxuu ku jiraa gacanta midig ee Layla. Sawirkiisa muraayadda wuxuu u eg yahay gacanta bidix.

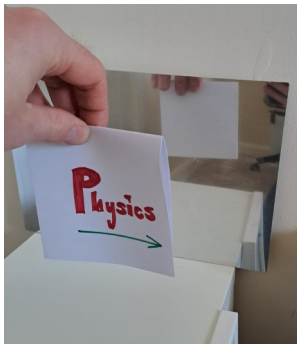
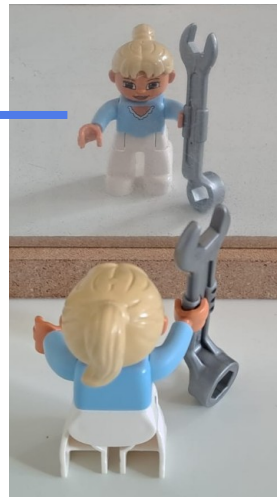
Saamaynta ayaa aad u muuqata marka la eego qoraalka.



Layla oo soo jeedda



sawirka (image) muraayadda



Baaritaanka sawirada muraayadda (mirror images)

Qaar ka mid ah qoraalka ku yaal baabuurta degdegga ah waa rogan yihiin dhinac (laterally inverted).

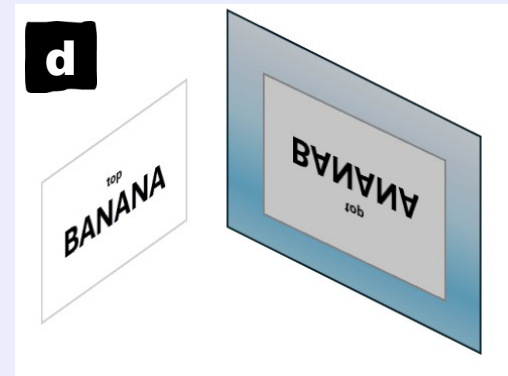
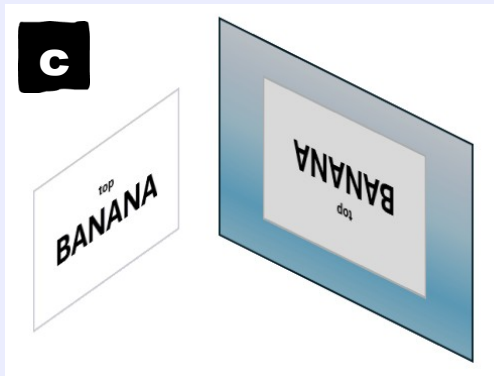
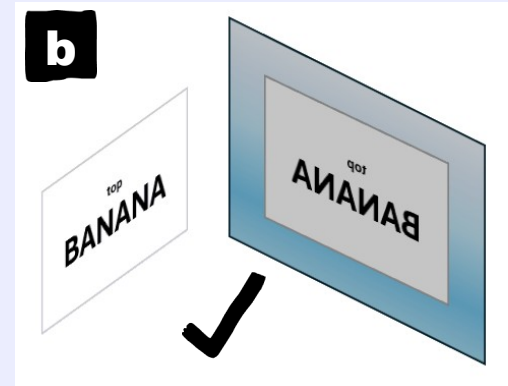
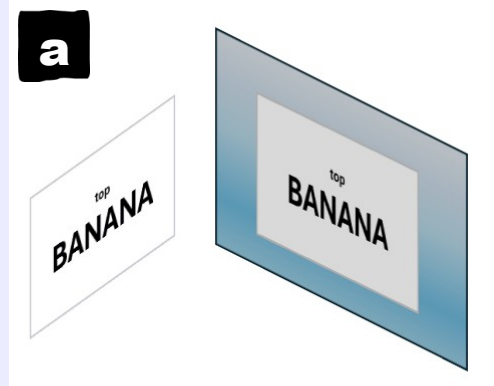


Tani waa si qoraalku u muuqdo qaab sax ah marka lagu arko muraayadda baabuurta kale.



Baaritaanka sawirada muraayadda (mirror images)

Waa kee milicsiga
saxda ah ee
qoraalka kaarka
cad?



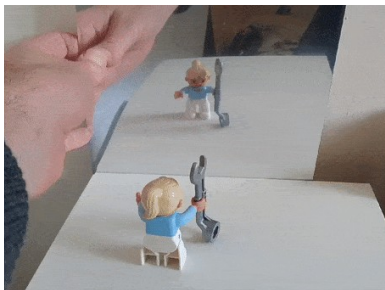


Caasha

Haddii sawirada muraayadda ay yihiin rogan dhinac (laterally inverted), maxay u rogmayn kor-hoos (vertically inverted)?
Miyay muraayaduhu garanayaan jihada kor?

Fikradda Caasha waa khalad: muraayaduhu ma dareemi karaan jihada kor.

Wareejinta muraayadda
gidaarka taagan saamayn
kuma leh milicsiga.
Waa had iyo jeer rogan
dhinac (laterally inverted).



Sawirka muraayadda
dhulka ku taal wuxuu u
muuqdaa rogan kor-hoos
iyo dhinac (vertically and
laterally inverted).

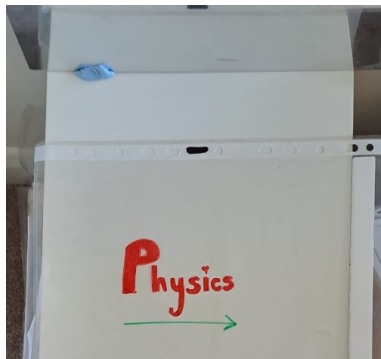


Muraayaduhu waxay si fudud u milicsadaan waxa hortooda ku yaal.

- Waxa ku yaal midigta horteeda muraayadda wuxuu ku yaali doonaa midigta milicsiga.
- Waxa ku yaal xagga sare horteeda muraayadda wuxuu ku yaali doonaa xagga sare milicsiga.
- Waxa ugu fog muraayadda wuxuu noqon doonaa kan ugu fog milicsiga.

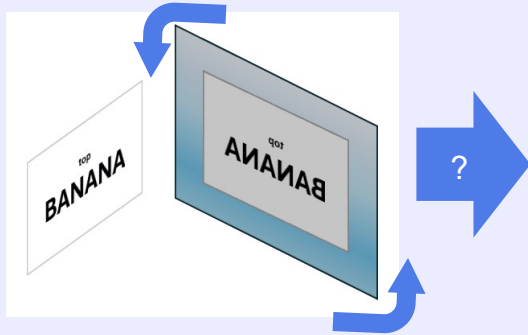


Qoraalka waa loo jeediyay muraayadda, muraayadduna waxay milicsataa waxa horteeda ku yaal.

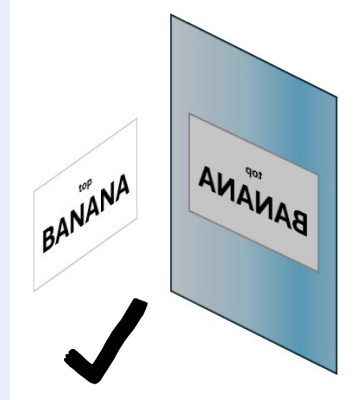


Baaritaanka sawirada muraayadda (mirror images)

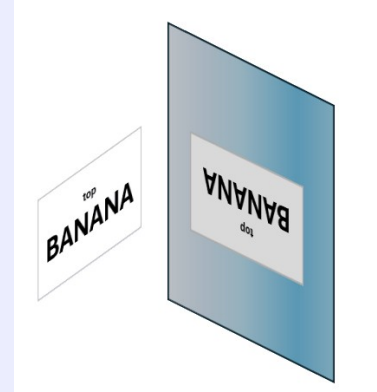
Maxaa dhacaya haddii aad muraayadda u rogtu 90° ?



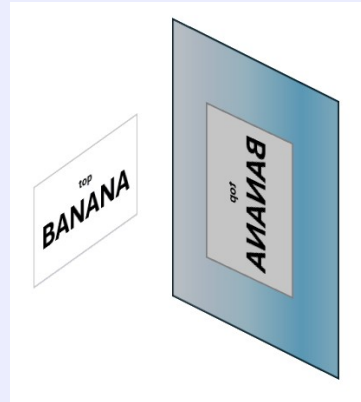
a



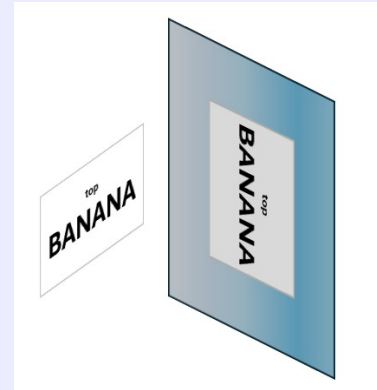
b



c



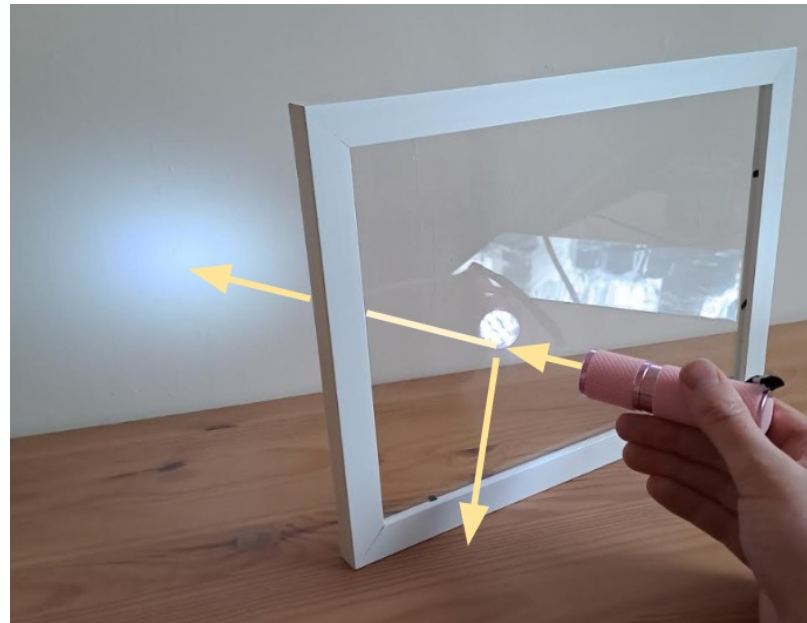
d



Galaasku waa daahsoon (transparent) sababtoo ah wuxuu gudbiyaa (transmits) inta badan iftiinka ku dhaca.

Si kastaba ha ahaatee, qaar ka mid ah iftiinka ayaa sidoo kale ka muuqda (reflected) dusha galaaska.

Tan waxaa loo isticmaali karaa in lagu abuuro khiyaano (illusions).



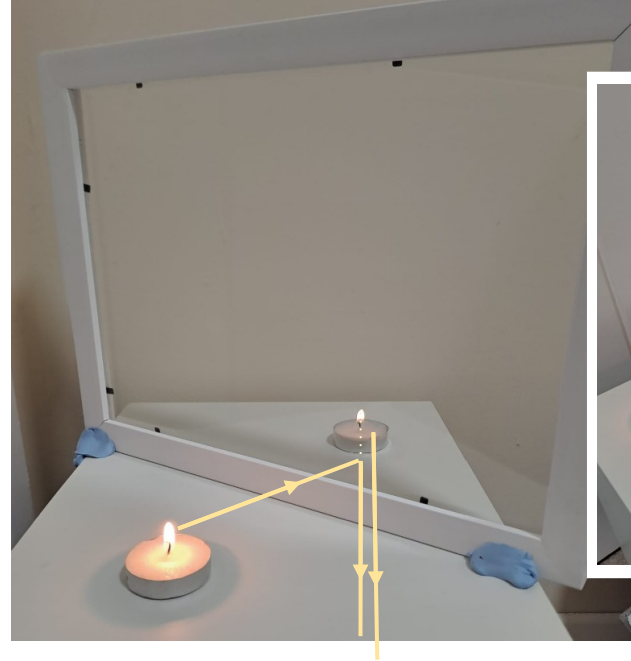
Shumashan waxay u muuqataa inay shidan tahay.

Si kastaba ha ahaatee, waxaad ku arki doontaa kaliya milicsiga (reflection) ololka, oo ka yimid shumac kale.

Iftiinka qolka ayaa ka muuqda (reflects) shumaca aan shidanayn oo wuxuu dhex maraa galaaska.

Wuxuu ku socdaa ishaada oo ay weheliso iftiinka ololka (ka muuqda galaaska).

Sidaas darteed waxaan ku aragnaa sawirka ololka oo ka sarreeya shumaca aan shidanayn.



Fiidiyow muujinaya xaglo kala duwan:

Watch ▶

Shumacyada iyo galaaska ayaa loo habeeyay si milicsiga (reflection) ololka uu ugu dhaco meel sax ah si shumaca aan shidanayn ugu muuqdo mid shidan.

Sawirka (milicsiga) ololka wuxuu u muuqdaa inuu halkan yahay.



Waxaan nidhaahnaa sawirka milicsan (reflected image) wuxuu ka dambeeyaa muraayadda.

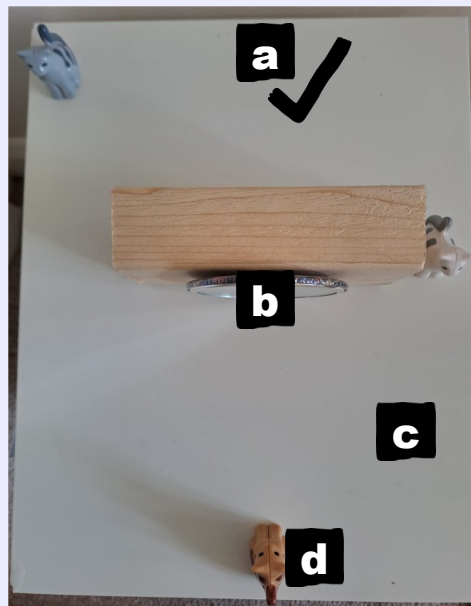
Milicsiga waxaa loo yaqaan sawirro aan dhab ahayn (virtual images) sababtoo ah ma jiraan raajo iftiin oo dhab ah oo ka yimaada sawirka oo ku soo gala ishaada.

Baaritaanka sawirada muraayadda (mirror images)



Bisad ayaa eegaysa muraayad.

Xaggee ayay ku taal milicsiga bisadda?



Milicsigu wuxuu u muuqdaa inuu ka dambeeyo muraayadda.

Baar sida goobta sawirka muraayadda u isbeddelo markaad shayga ka dhaqaajiso dusha milicsiga.

Samee shaashad hufan (oo leh cago deggan ama qabato), laba shumac iyo laba xisaab (rulers) sida ku cad.

Shid shumaca kuugu dhow oo u dhaqaaji shaashadda.

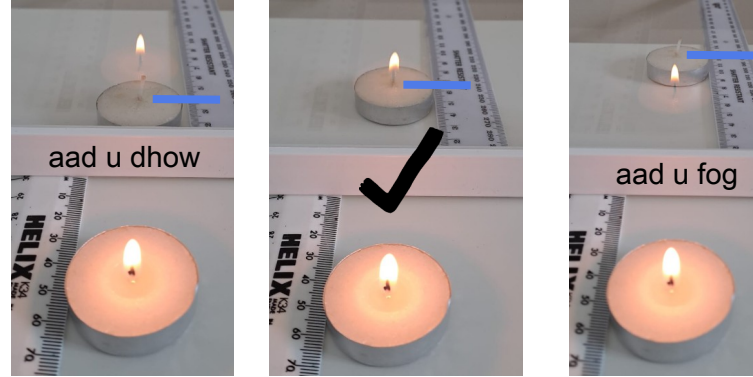
Qiyaas oo duub masaafada ololkeeda u jirto shaashadda (screen).



Dhaqaaji shumaca (candle) ka dambeeya shaashadda (screen) ilaa uu u ekaado sidii oo shidan yahay.

Qiyaas oo duub masaafada u jirta shaashadda (screen).

Qaado qiyaaso dheeri ah oo shumaca shidan leh shan masafo oo kale oo u jira muraayadda (mirror).



masaafada ololka u jirta shaashadda (cm)	masaafada milicsiga (reflection) ka dambeeya shaashadda (cm)

Natijjooyin tusaale.

Kala duwanaanshaha masaafooyinka ayaa ku xidhan qalabka saxda ah ee la isticmaalay.

masaafada ololka u jirta shaashadda (cm)	masaafada milicsiga (reflection) ka dambeeya shaashadda (cm)
5	5
10	10
15	16
20	20
25	24
30	31

Milicsiga (Reflections) muraayadaha (mirrors)



Baaritaanka sawirada muraayadda (mirror images)



Gunaanad (Conclusions)

Gunaanadku (conclusion)
wuxuu sheegaa waxa aad ku
ogaatay tijaabada (experiment),
iyo sida aad tan u ogaatay.

Gunaanad (Conclusion)

Waxaan ogaaday in ...

Run ama been? Natiijooyinka jadwalku waxay taageeraan gabagabada ah in milicsigu u muuqdo inuu yahay isla fogaanta gadaasha muraayadda sida shayga hortiisa ugu yaal.



Run



Been

Caddee jawaabtaada.

a

Way adag tahay in la qiyaaso fogaanta saxda ah, marka waxaad filan kartaa qaladaad yaryar.

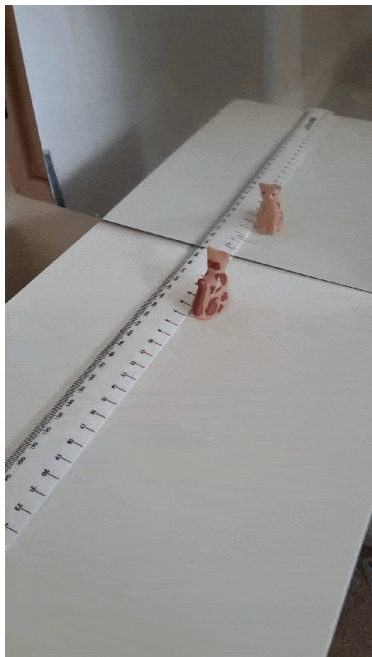


b

Natiijooyinka, milicsigu mar walba isku fogaanta kama dambeeyo shaashadda sida shayga (ololka) hortiisa ugu yaal.

fogaanta ololka iyo shaashadda (cm)	fogaanta milicsiga gadaasha shaashadda (cm)
5	5
10	10
15	16
20	20
25	24
30	31

Milicsigu wuxuu u muuqdaa inuu yahay isla fogaanta gadaasha muraayadda sida shayga hortiisa ugu yaal.

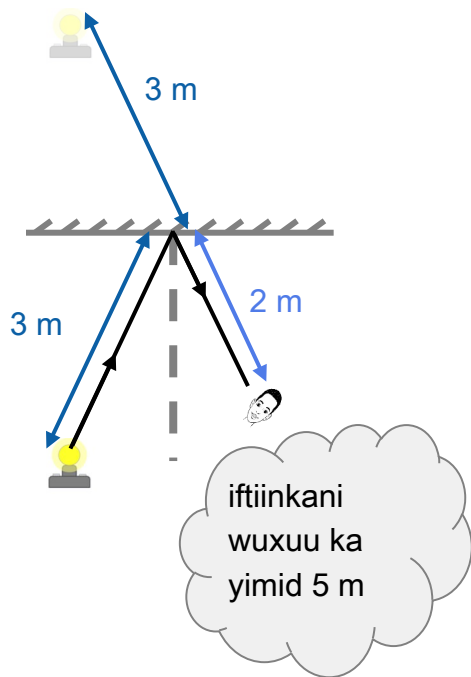


Milicsigu runti kama dambeeyo muraayadda, sababtoo ah ma aha shay dhab ah.

Waa sawirro (images).

Meelaha milicsigu u muuqdo inuu ka dambeeyo inta badan ma jiraan dhab ahaan.

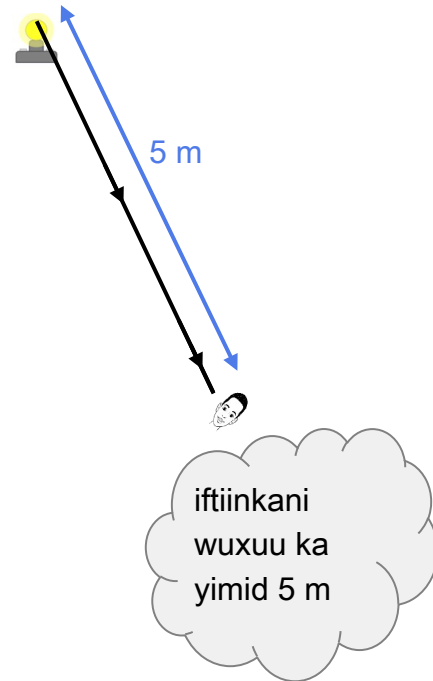
Milicsigan, iftiinku wuxuu safraa 3 m ilaa muraayadda, ka dibna 2 m muraayadda ilaa indhaha Saciid.



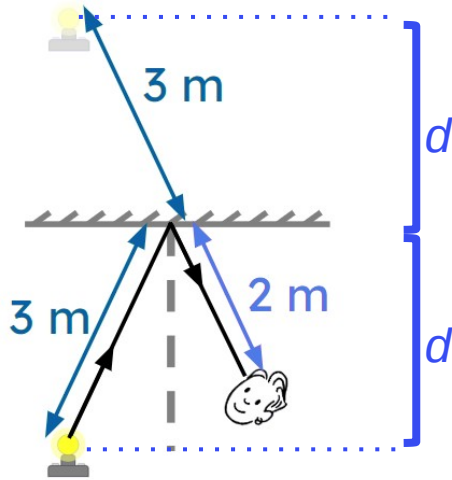
Indhaha Saciid waxay ogaadaan iftiin ku yimaada xagal gaar ah oo 5 m u jira.

Indhaha Saciid, xaaladdu waxay lamid tahay haddii runti lahaa laambad 5 m u jirta jihadaas.

Marka waa waxa ay aragto: laambad (milicsiga) oo u muuqata inay 5 m u jirto.

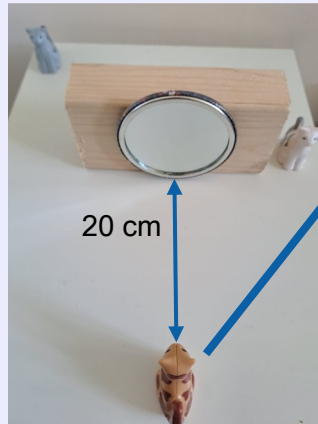


Taasi waa sababta milicsigu mar walba ugu muuqdo isla fogaanta gadaasha muraayadda sida shayga hortiisa ugu yaal.



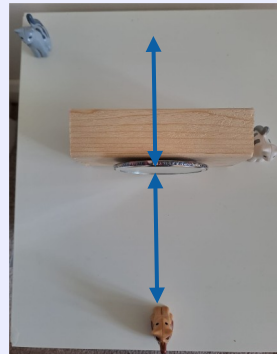
Inta uu iftiinka (light) u socdo ka hor inta uusan ku dhicin muraayad (3 m kiiskan), waa masaafada uu milicsiga (reflection) uga muuqdo gadaasha muraayadda.

Masaafada tooska ah (d) ee muraayadda sidoo kale waa siman yihiin.



Bisad (cat) ayaa eegaysa muraayad.

Intee ayuu uga fog yahay bisadda milicsiga (reflection) bisadda u muuqdo?



Jawaabaha:

20 cm 20 cm
cm

a

10 cm

b

20 cm

c

In yar ka badan 20 cm

d

30 cm

e

40 cm

f

80 cm



1. Sharax sababta milicsiga (reflections) looga arko muraayadaha.
2. Qeex oo sharax sifooyinka milicsiga (reflections) (sawirada muraayadda).

Jawaabaha tusaalaha ah (Example answers).

1. Sharax sababta milicsiga (reflections) looga arko muraayadaha.

Muraayaduhu aad bay u dhalaalaan, sidaas darteed waxay milicsadaan (reflect) iftiinka (light) ku dhaca. Qaar ka mid ah iftiinka (light) ayaa nagu soo milicsada indhaha, taasoo keenta inaan ku aragno sawir (image) muraayadda. Sawirka (image) wuxuu ku yaal meesha iftiinka (light) uu uga soo muuqdo inuu ka yimid, taasoo ah gadaasha muraayadda.

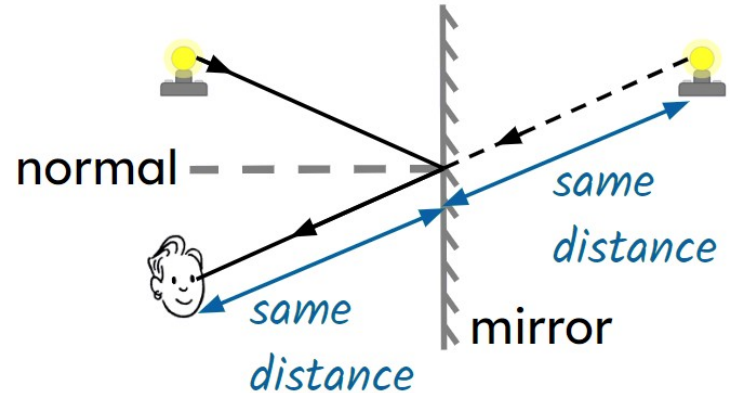
2. Sharax oo faahfaahi sifooyinka milicsiga (reflections) (sawirrada muraayadda).

Milicsiga (reflections) (sawirada muraayadda) waxay u muuqdaan masaafo isku mid ah gadaasha muraayadda sida shayga (object) uga horreeyo muraayadda, iyagoo toosan. Waxa ku jira midigta horteeda muraayadda wuxuu ku jiri doonaa midigta milicsiga (reflection) (markaad eegayso). Tani waxay keentaa in qoraalka u jeeda muraayadda uu rogmodo dhinac (laterally inverted). Shayga (Objects) ku jira midigtaada wuxuu ku jiraa bidixda milicsigaaga (reflection) (haddii ay qof kaa soo horjeedaan).

Iftiinka (light) ayaa ka milicsanaya muraayadaha (iyo dusha kale ee dhalaalaya) isagoo raacaya sharciyada milicsiga (laws of reflection).

Qaar ka mid ah iftiinka (light) ayaa lagu milicsadaa indhahayaga taasoo keenta inaan aragno sawir (image) muraayadda dhexdeeda.

Sawirku (image) wuxuu u muuqdaa inuu ka yimid meesha iftiinku (light) ka yimid, taasoo ah masafo (distance) la mid ah gadaasha muraayadda sida shayga (object) uga hor jeedo muraayadda.



Sawirka (image) muraayadda waa mid toosan (right way up). Wax kasta oo ku yaal midigta muraayadda horteeda waxay ku jiri doonaan midigta milicsiga (reflection). Tani waxay keentaa in qoraalka muraayadda horteeda uu noqdo mid rogan (laterally inverted), iyo walxaha ku yaal midigtaada waxay ku yaalliin bidixda milicsigaaga (haddii ay qof kaa soo hor jeedo).