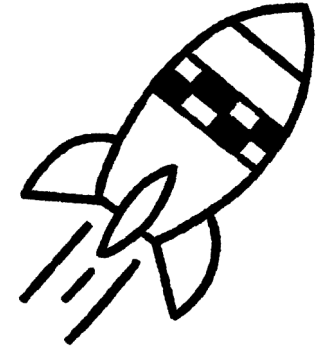


Qiyaasidda mugga sambabada (Estimating lung volume)



Sayniska

Cutub: Neefsashada iyo neefsiga (Breathing and respiration)

Natiijo

Waxaan qiyaasi karaa sida loo isticmaalo qalab fudud si loo qiyaaso mugga sambabada (lung volume).

Erayada muhiimka ah

mug (volume)

Qadarka booska saddex-geesoodka ah ee uu qaato walax; badanaa waxaa lagu cabbiraa cm³.

awoodda neefsashada (vital capacity)

Mugga ugu badan ee hawada laga neefsan karo ka dib neefsashada buuxda.

sax ah (accurate)

Marka cabbirku uu u dhawaado qiimaha (value) runta ah, waxaa la yiraahdaa waa sax (accurate).

meniscus

Dusha dareeraha, kaas oo u muuqan kara qalloocan.

qiyaas (estimate)

Qiime (value) qiyaas ah (ku dhawaad) oo tiro ah (oo la helay iyada oo aan la qaadin cabbirro sax ah).

Qiyaasidda mugga sambabada (Estimating lung volume)



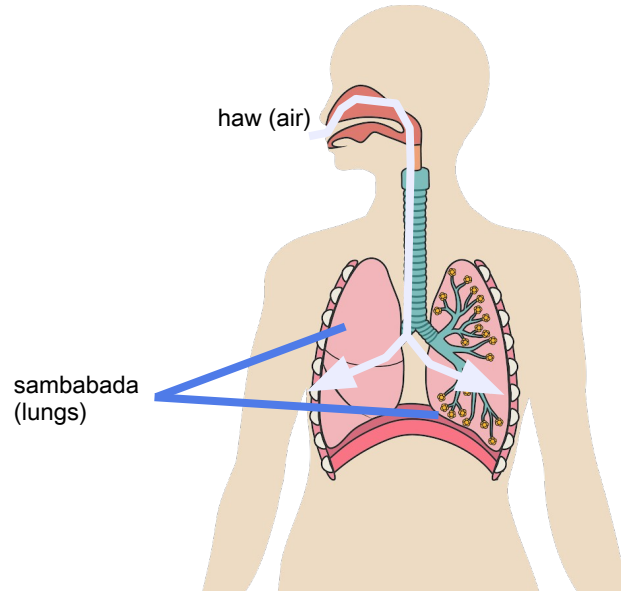
Qalabka lagu cabbiro awoodda neefsashada (vital capacity)



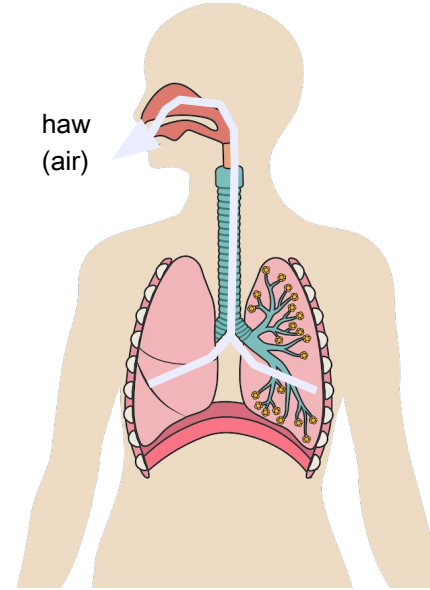
Cabbirka fudud ee awoodda neefsashada (vital capacity)



Qiyaasidda mugga sambabada (Estimating lung volume)



Marka aan neefsano (breathe in), hawadu waxay ku dhaqaaqdaa sambabada.

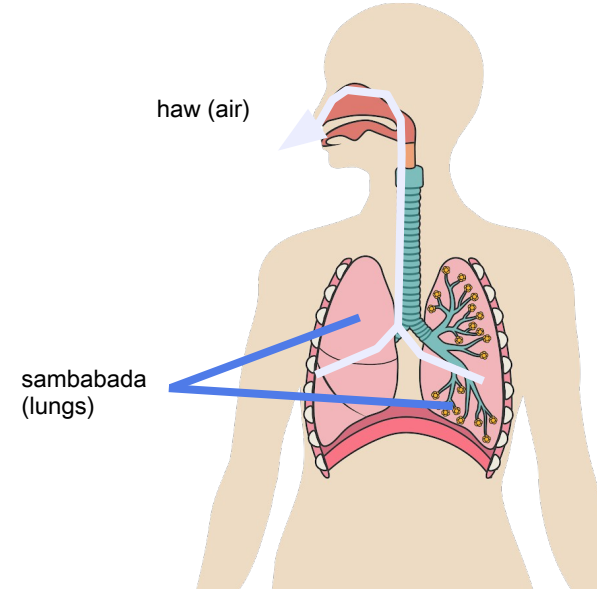


Marka aan neefsano (breathe out), hawadu waxay ka baxdaa sambabada.

Markaan neefsanno (exhale), inta badan haw (air) waxaa laga saaraa sambabada (lungs), laakiin qaar baa halkaas ku hadha.

Mugga ugu weyn ee haw (air) aad neefsato ka dib markaad si buuxda u neefsato waxaa loo yaqaan awoodda nolosha (vital capacity).

Awoodda nolosha (vital capacity) waxaa saameeya arrimo ay ka mid yihiin da'da qofka, heerka dhaqdhaqaaqiisa, iyo haddii uu sigaar cabbo ama uu qabo neef-wareer (asthma).



Qalabka lagu cabbiro awoodda nolosha (vital capacity)

Awoodda nolosha (vital capacity) waa mugga ugu weyn ee haw (air) ee...

a

...sambabada (lungs) qaadi karaan.

b

...la neefsan karo (exhaled) ka dib marka si buuxda loo neefsado (inhaling).

c

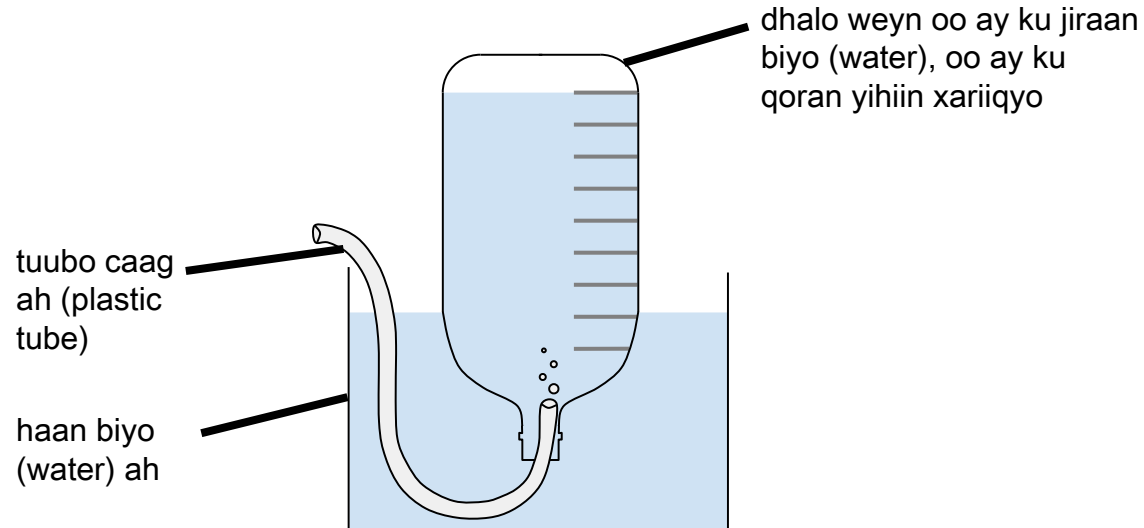
...sambabada (lungs) soo jiidi karaan (inhaled).

Qalabka lagu cabbiri awoodda nolosha (vital capacity)



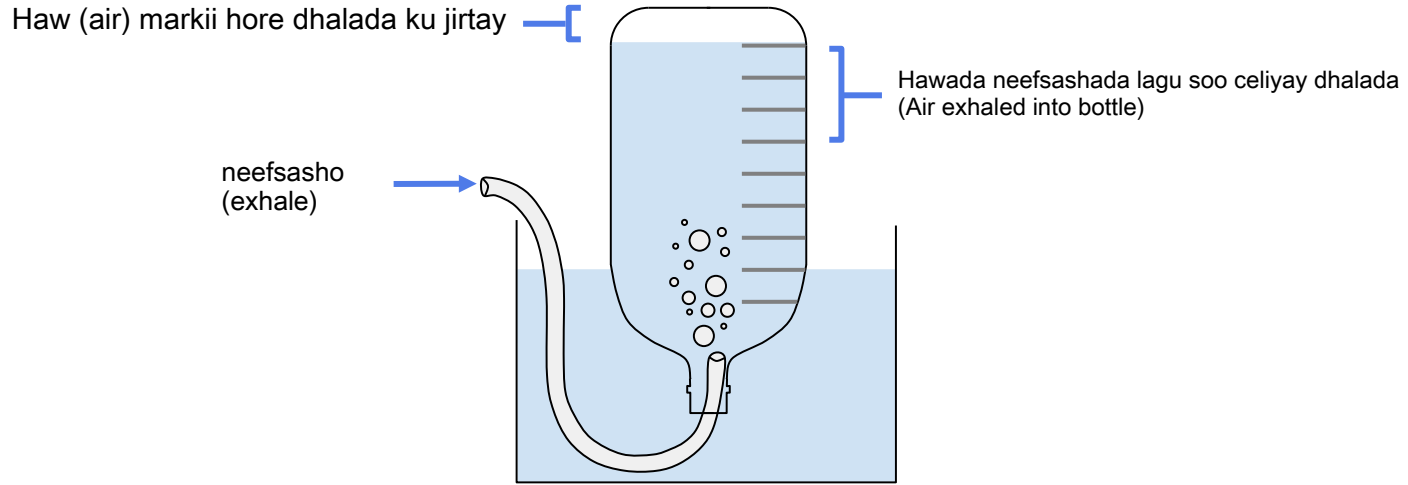
Sharaxaad

Waxaad cabbiri kartaa awoodda nolosha (vital capacity) adoo isticmaalaya qalab fudud:



Neefsashada (exhaling) tuubada waxay haw (air) ka soo rartaa sambabada (lungs) gudaha dhalada.

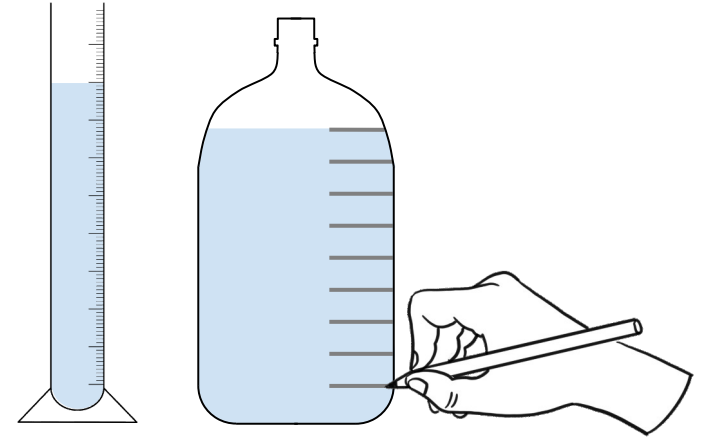
Tani waxay qaar ka mid ah biyaha (water) dhalada ku jira u rartaa haanta.





Tilmaamaha habaynta qalabka (Instructions for setting up the apparatus):

1. Cabbir 200 cm³ oo biyo (water) ah galaas cabbir (measuring cylinder).
2. Ku shub 200 cm³ oo biyo (water) ah dhalo 5 litir (5 l) ah.
3. Ku calaamadee heerka biyaha (water) dusha dhalada qalinka joogtada ah (permanent marker).
4. Ku celi tillaabooyinka 1, 2 iyo 3 ilaa dhaladu ay ka buuxsanto biyo (water).

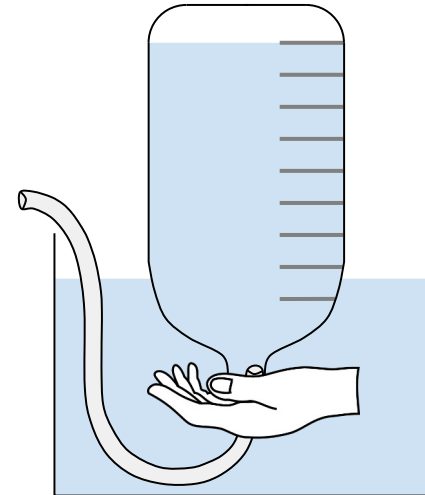


5. Dabool dhammaadka furan ee dhalada, ka dibna u rog dhalada hoos u jeed.

Iska jir inaad daadiso biyaha (water)!

6. Dhig dhalada haan biyo (water) ah, iyadoo dhammaadka furan ee dhalada uu biyaha (water) hoostooda yahay.

7. Geli dhammaadka tuubada caagga ah (plastic tube) dhalada. Ka tag dhammaadka kale biyaha (water) ka baxsan.





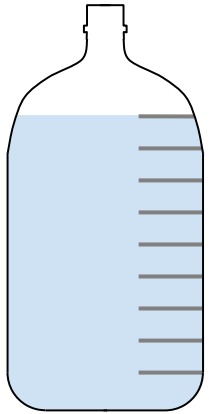
Dhig tillaabooyinka sida saxda ah si loo habeeyo qalabka.

- | | | |
|----------|---|---|
| a | Dhig dhalada hoos u jeed haan biyo (water) ah. | 4 |
| b | Ku shub 200 cm ³ oo biyo (water) ah dhalo weyn. | 2 |
| c | Cabbir 200 cm ³ oo biyo (water) ah galaas cabbir (measuring cylinder). | 1 |
| d | Ku celi oo calaamadee heerka 200 cm ³ kasta oo biyo (water) ah dusha weelka. | 3 |
| e | Geli dhammaadka tuubada caagga ah (plastic tube) dhalada. | 5 |

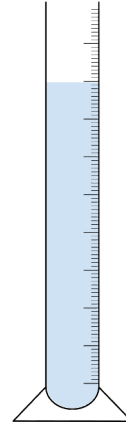
Qalabka lagu cabbiro awoodda muhiimka ah (Apparatus for measuring vital capacity)



Sharaxaad



Waa inay jiraan 200 cm³ oo biyo (water) ah oo u dhexeeya sadar kasta.



Tani waxay noqon doontaa oo keliya haddii mugga biyaha (water) si sax ah loo qiyaasay iyadoo la isticmaalayo weelka qiyaasta (measuring cylinder).

Marka uu muggu u dhow yahay qiimaha (value) saxda ah (200 cm³), cabbirku wuu ka saxan yahay.

Maxay 'sax' (accurate) ka dhigan tahay?

a

Qiyaastu waxay u dhowdahay qiimaha (value) runta ah.



b

Pipette ayaa loo isticmaalay in lagu daro qaybta ugu dambaysa ee biyaha (water) si taxadar leh.

c

Qiyaasta waa la soo celiyey (repeated).



Si loo qiyaaso mugga 200 cm^3 oo dareere (liquid) ah sida ugu saxan ee suurtoogalka ah iyadoo la isticmaalayo weelka qiyaasta (measuring cylinder):

1. Ka fiirso weelka qiyaasta (measuring cylinder) dhinaca. Dhig ishaada si ay u siman tahay calaamadda 200 cm^3 .
2. Isticmaal weel (beaker) si aad ugu shubto biyo (water) weelka qiyaasta (measuring cylinder) ilaa ay ku dhawaadaan calaamadda 200 cm^3 .
3. Isticmaal pipette si aad biyo (water) ugu soo dajiso gidaarka gudaha ee weelka qiyaasta (measuring cylinder) ilaa ay gaadho calaamadda 200 cm^3 .



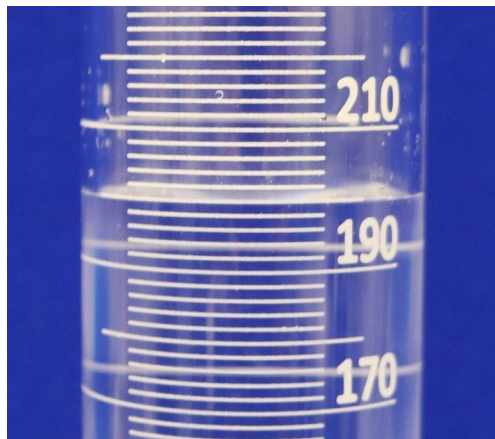
Watch 

Qalabka lagu qiyaaso awoodda neefsiga (vital capacity)

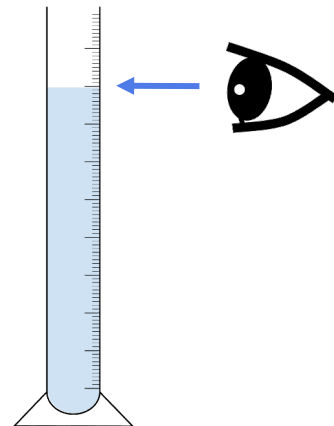
Waa muhiim inaad ka fiirsato weelka qiyaasta (measuring cylinder) dhinaca oo aad ishaada u dhigto si ay u siman tahay calaamadda aad rabto inaad ku buuxiso.



Marka laga eego kor, mugga dareeraha (liquid) wuxuu u muuqdaa mid wax yar ka badan 200 cm³.



Laakiin marka laga eego dhinaca, waxaan arkaynaa inuu si sax ah ugu yaal calaamadda 200 cm³.

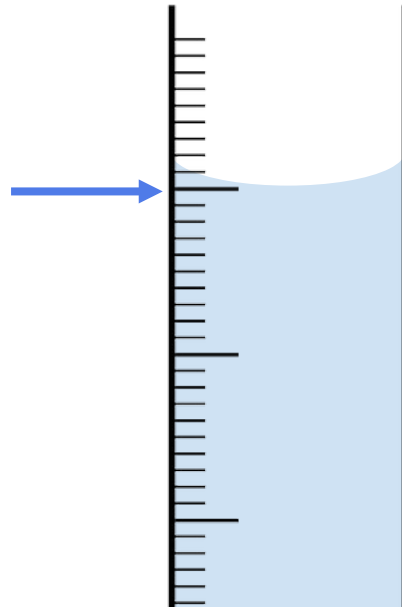


Qalabka lagu qiyaaso awoodda neefsiga (vital capacity)

Waxaa laga yaabaa inaad ogaato in dusha biyaha (water) ee weelka qiyaasta (measuring cylinder) uu qaloocan yahay.

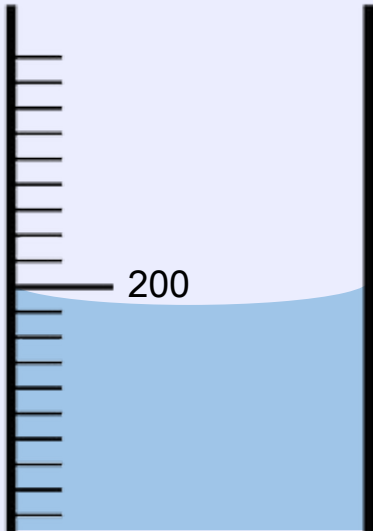
Tan waxaa loo yaqaan meniscus.

Waxaan akhrinaynaa mugga biyaha (water) saldhigga hoose ee meniscus.

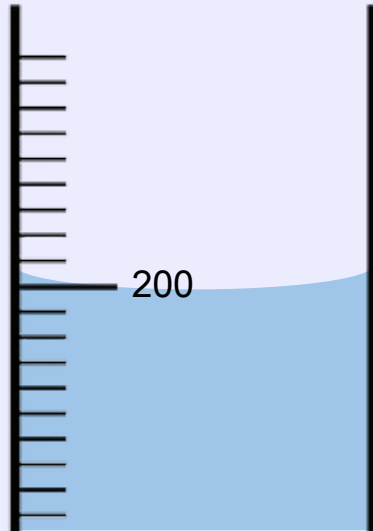


Qalabka lagu qiyaaso awoodda neefsiga (vital capacity)

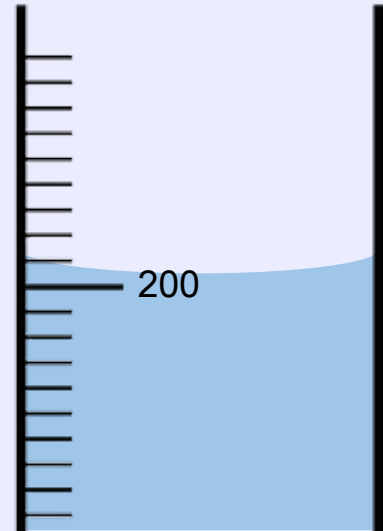
Weele qiyaas (measuring cylinder) kee ayaa ku jira 200 cm³ oo biyo (water) ah?



a

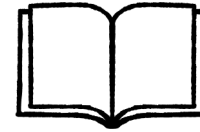


b



c

Raac habka ku qoran warqadda shaqada
si aad u dejiso qalabka.



Sharax sababta ay muhiim u tahay inaad ka eegto dhanka
dhinaca ee qiyaasaha (measuring cylinder) markaad
qiyaasayso 200 cm³ oo biyo ah.

2. Sharax sababta ay muhiim u tahay inaad ka eegto dhanka dhinaca ee qiyaasaha markaad qiyaasayso 200 cm³ oo biyo ah.

- Ka eegista dhinaca waxay kuu ogolaaneysaa inaad isha ku hagaajiso heerka 200 cm³.
- Tani waxay kuu ogolaaneysaa inaad aragto marka heerka biyuhu si sax ah ugu yaallo calaamadda 200 cm³.
- Tani waxay ka dhigaysaa qiyaasta mid sax ah (ku dhow qiimaha dhabta ah ee 200 cm³).

Estimating lung volume



Apparatus for measuring vital capacity



Simple measurement of vital capacity



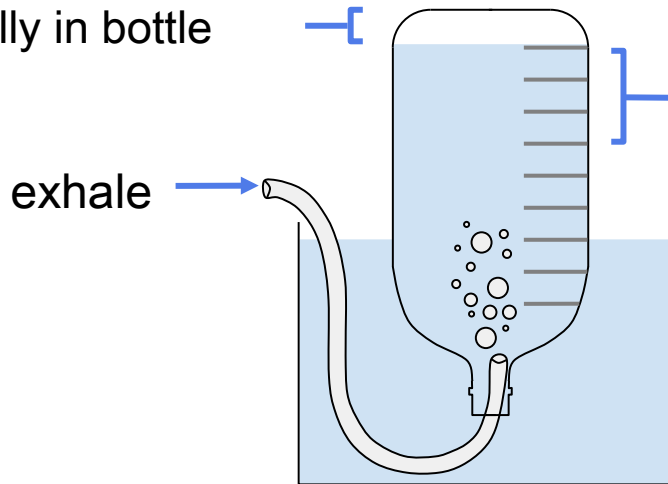
Estimating vital capacity

Simple measurement of vital capacity

Si aad u isticmaasho qalabka si aad u qiyaasto awoodda neefsashada (vital capacity), bilow adigoo ogaaday khadka ay biyuhu ka bilaabaan.

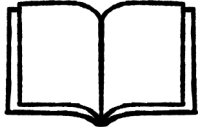
Kadib neefso (exhale) tuubada.

Air originally in bottle



Tiri inta khad ee heerka biyuhu hoos uga dhacay.

Farqiga kasta ee u dhexeeya khadadka wuxuu u taagan yahay 200 cm³.

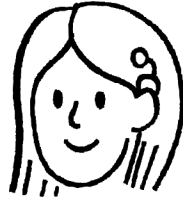


Isticmaalka qalabka lagu cabbiro awoodda nolosha (vital capacity):

1. Note which line the water level is at in the bottle.
2. Breathe in (inhale) as fully as you can.
3. Neefso (exhale) tuubada si buuxda oo aad awooddo.
4. Tiri inta xariiq oo heerka biyo (water) ee dhalada hoos uga dhacay.
5. Ku dhufo tirada xariiqda 200 cm³ si aad u qiyaasto awoodda noloshaada (vital capacity).



Ka dib markii Suad neefsashada ku sii daysay tuubada, heerka biyo (water) ee dhalada wuxuu hoos uga dhacay 14 xariiq.



Waa maxay awoodda nolosha (vital capacity) ee Suad?

- Farqiga u dhexeeya xariiq kasta wuxuu ka kooban yahay 200 cm³
- $200 \times 14 = 2800 \text{ cm}^3$

Ka dib markii Cali neefsashada ku sii daysay tuubada, heerka biyo (water) ee dhalada wuxuu hoos uga dhacay 15.5 xariiq.

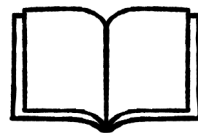


Waa maxay awoodda nolosha (vital capacity) ee Cali?

- Farqiga u dhexeeya xariiq kasta wuxuu ka kooban yahay 200 cm³
- $200 \times 15.5 = 3100 \text{ cm}^3$

Raac habka ku qoran warqadda shaqada si aad u isticmaasho qalabka lagu cabbiro awoodda nolosha (vital capacity).

Kadib buuxi shaxda natiijadaada.



magac	tirada xariiqda	awoodda nolosha (vital capacity) (cm ³)
Suad (Sofia)	14	2800
Cali (Andeep)	15.5	3100

Suad iyo Cali waxay ku bartaan dugsiga in sigaarka uu yareyn karo awoodda muhiimka ah (vital capacity).

Jadwalku wuxuu muujinayaa laba qof oo leh awoodo muhiim ah oo kala duwan.

	awoodda muhiimka ah (vital capacity) (cm ³)
Qofka A	4100
Qofka B	3500

Suad waxay tidhi:

Ma Suad ayaa sax ah?

Sharax sababta ama sababta aan ahayn.

Qofka B waa inuu yahay sigaar cabbe sababtoo ah awooddiisa muhiimka ah (vital capacity) waa ka hooseysaa.



Ma Suad ayaa sax ah?

Sharax sababta ama sababta aan ahayn.

- Suad waxay sax tahay in sigaarku hoos u dhigo awoodda muhiimka ah (vital capacity).
- Waxay khalad tahay inay tidhaahdo Qofka B waa inuu yahay sigaar cabbe.
- Waxaa jiri kara sababo badan oo Qofka B uu u leeyahay awood muhiim ah oo hoose. Tusaale ahaan, waxay noqon karaan kuwa aad u yar, aad u weyn, ama kuwa aan jir ahaan u fiicnayn, ama waxay qabi karaan asthma.

Qiyaasidda mugga sambabada (lung volume)



Qalabka lagu qiyaaso awoodda muhiimka ah (vital capacity)



Qiyaas fudud oo awoodda muhiimka ah (vital capacity)

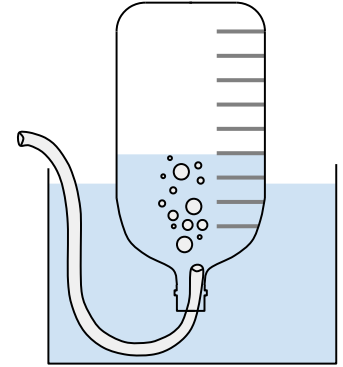


Qiyaasidda mugga sambabada (lung volume)

Xataa haddii 200 cm^3 oo biyo (water) ah si sax ah loo qiyaaso mar kasta oo lagu daro dhalada, qiyaasta awoodda muhiimka ah (vital capacity) waxaa laga yaabaa inaysan ahayn mid sax ah (ku dhawaad qiimaha (value) dhabta ah).

Sababaha tan waxaa ka mid ah:

- Qofka laga yaabaa inuusan si buuxda u neefsan (inhale) ka hor inta uusan ku neefsan (exhale) tuubada.
- Qofka laga yaabaa inuusan si buuxda ugu neefsan (exhale) tuubada.
- Khadadka muujinaya 200 cm^3 kasta laga yaabaa inaan si sax ah loogu calaamadin dhalada.
- Ka dib neefsashada (exhaling), heerka biyaha (water) wuxuu ku dhaman karaa inta u dhaxaysa laba khad.

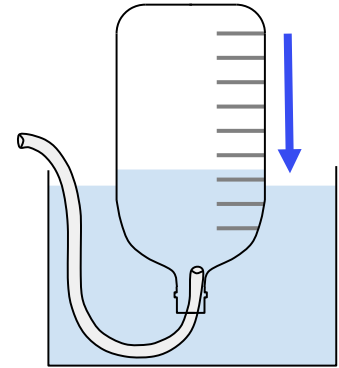


Marka heerka biyaha (water) uu ku dhamo inta u dhaxaysa laba khad ka dib neefsashada (exhaling), waa inaan ama:

- go'aansanno khadka ugu dhow oo xisaabino mugga (volume) ilaa 200 cm³ u dhow (tusaale: 6 khad x 200 cm³)

ama

- isticmaalno garashadayada si aan u go'aansanno inta u dhaxaysa khadadka oo aan u isticmaalno jajab tobanle (decimal) si aan u xisaabino mugga (volume) (tusaale: 5.5 khad x 200 cm³)

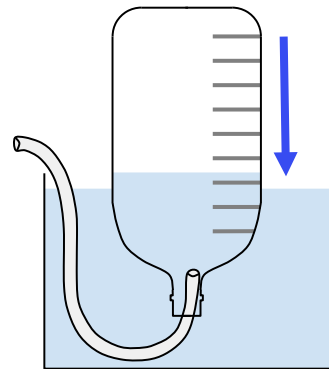


Dhammaan arrimahan waxay ka dhigan yihiin in cabbirka awoodda nolosha (vital capacity) iyadoo la isticmaalayo qalabkan uu noqon karo mid aan sax ahayn, waa qiyaas (estimate).

Qiyaas (estimate) waa qiime (value) qiyaas ah (ku dhawaad) oo tiro (quantity) ah (oo la helay iyada oo aan la qaadin cabbiro sax ah).

Waxaan heli karnaa qiyaas (estimate) ka fiican adoo:

- ku cabbiraya biyaha (water) dhalada qaybo ka yar 200 cm³ oo khadadka isu soo dhaweynaya
- ku celcelinaya habka (procedure) dhowr jeer oo xisaabinaya celceliska (mean/average) cabbirada. Tani waxay yaraynaysaa saamaynta dadka aan si buuxda u neefsan (inhale) ama u neefsan (exhale) inta lagu jiro isku dayga.



Waa maxay qiyaas (estimate)?

- a** cabbir sax ah (accurate measurement)
- b** cabbir qiyaas ah (approximate measurement) ✓
- c** qiyaas (guess)

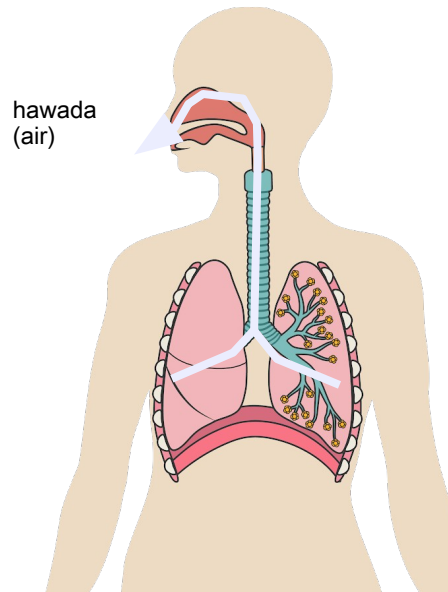
Dhammaan hawadu kama baxdo sambabadeena marka aan neefsano (exhale). Qaar baa hadha si ay u joojiyaan sambabada inay burburaan.

Awooddeena muhiimka ah (vital capacity) waxay caadi ahaan ku dhowdahay 80% ee mugga sambabada (lung volume).

Sidaa darteed, waxaan u isticmaali karnaa cabbirka awoodda muhiimka ah (vital capacity) si aan u soo saarno qiyaasta mugga sambabada (lung volume).

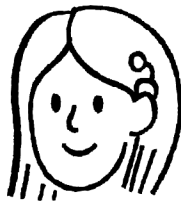
Waxay noqon doontaa oo kaliya qiyaas (estimate) mugga sambabada (lung volume) sababtoo ah:

- cabbirka awoodda muhiimka ah (vital capacity) wuxuu ahaa qiyaas (estimate)
- awoodda muhiimka ah (vital capacity) laga yaabaa inaysan si sax ah u ahayn 80% ee mugga sambabada (lung volume).



Suad waxay cabirtay awooddeeda muhiimka ah (vital capacity) inay tahay 2800 cm³.

Qiyaas mugga sambabada (lung volume) ee Suad.



- Awoodda muhiimka ah (vital capacity) waxay ku dhowdahay 80% ee mugga sambabada (lung volume).
- Sidaa darteed, haddii 2800 cm³ uu yahay 80%

$$1\% = 2800 \div 80 = 35 \text{ cm}^3$$

$$100\% = 35 \times 100 = 3500 \text{ cm}^3$$

Cali wuxuu cabiray awooddiisa muhiimka ah (vital capacity) inay tahay 3100 cm³.

Qiyaas mugga sambabada (lung volume) ee Cali.



- Awoodda muhiimka ah (vital capacity) waxay ku dhowdahay 80% ee mugga sambabada (lung volume).
- Sidaa darteed, haddii 3100 cm³ uu yahay 80%

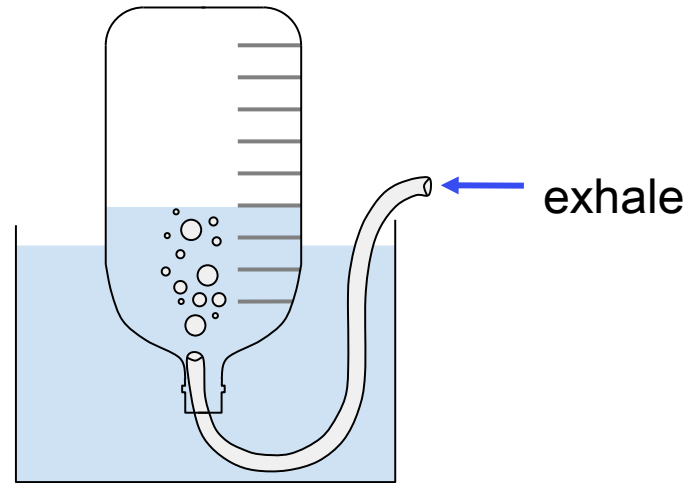
$$1\% = 3100 \div 80 = 38.75 \text{ cm}^3$$

$$100\% = 38.75 \times 100 = 3875 \text{ cm}^3$$

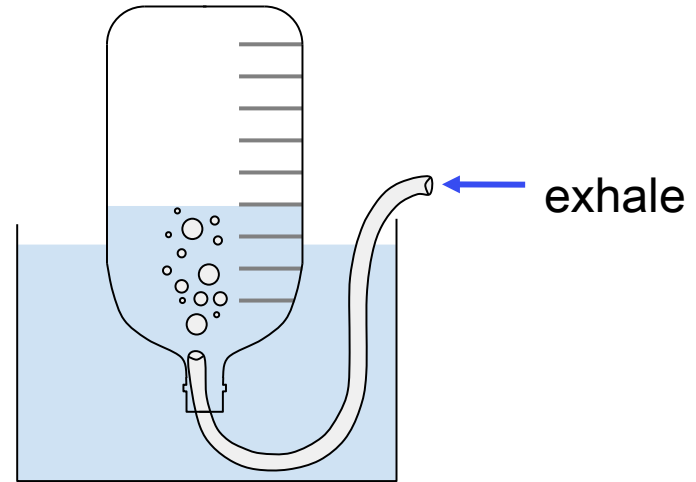
Neefsashada (Exhaling) qalabkan waxay bixisaa qiyaas (estimate) awoodda muhiimka ah (vital capacity) ee sambabada.

Alex wuxuu neefsadaa qalabka wuxuuna qiyaasaa awoodda neefsashadiisa inay tahay 3000 cm^3 .

1. Sharax sababta qiyaastiisu (estimate) u noqon karto cabbir aan sax ahayn ee awooddiisa muhiimka ah (vital capacity).
1. Sharax sida Alex u isticmaali karo qalabkan si uu u helo qiyaas ka fiican oo awoodda neefsashadiisa ah.



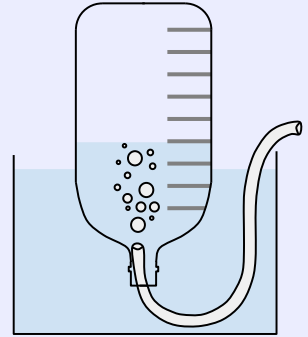
3. Alex estimated his vital capacity as 3000 cm^3 . Estimate his lung volume.
3. Sharax sababta qiyaastan ee mugga sambabkiisa u noqon karto mid aan sax ahayn.



Alex wuxuu neefsiiyaa qalabka oo wuxuu qiyaasaa awooddiisa neefsashada (vital capacity) inay tahay 3000 cm^3 .

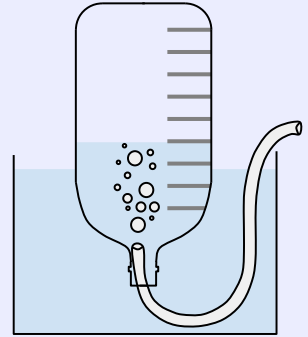
1. Sharax sababta qiyaastiisu u noqon karto mid aan ahayn cabbir sax ah oo awoodda neefsashada (vital capacity).

- Alex laga yaabaa inuusan si buuxda u neefsan ama u neefsan.
- Khadadka laga yaabaa inaan si sax ah loogu calaamadin dhalada.
- The water level may end up between two lines.
- Mugga laga yaabaa in loo xisaabiyay khadka ugu dhow (ugu dhow 200 cm^3).
- Laga yaabaa in la adeegsaday go'aan qiyaas ah si loo go'aamiyo inta u dhaxaysa labada khad ee heerka biyuhu yahay.



2. Sharax sida uu ugu isticmaali karo qalabkan si uu u helo qiyaas ka fiican oo awooddiisa neefsashada (vital capacity).

- Khadadka isku soo dhoweey si ay u cabbiraan mugyo ka yar 200 cm³.
- Ku celi habka dhowr jeer oo xisaabi celceliska (average) mugga.



3. Alex estimated his vital capacity as 3000 cm³. Estimate his lung volume.

Awoodda neefsashada (vital capacity) waxay ku dhowdahay 80% mugga sambabka.

So, if 3000 cm³ is 80%

$$1\% = 3000 \div 80 = 37.5 \text{ cm}^3$$

$$100\% = 37.5 \times 100 = 3750 \text{ cm}^3$$



4. Sharax sababta qiyaastan ee mugga sambabadiisa aanu u noqon karin mid sax ah.

- Waxaad u isticmaashaa awoodda muhiimka ah (vital capacity) si aad u xisaabiso mugga sambabada. Qiimihii asalka ahaa ee awooddiisa muhiimka ahaa wuxuu ahaa qiyaas, waxaan kaliya qiyaasi karnaa mugga sambabada qiimahan.
- Awoodda muhiimka ah (vital capacity) daruuri ma aha inay tahay 80% mugga sambabada, maxaa yeelay tani way ku kala duwan tahay qof ilaa qof.

- Awoodda muhiimka ah (vital capacity) ee sambabada waa mugga ugu weyn ee hawada (air) la neefsano karo ka dib marka si buuxda loo neefsado.
- Qalab fudud ayaa loo isticmaali karaa in lagu qiyaaso awoodda muhiimka ah (vital capacity).
- Marka uu qiyaas uu ku dhow yahay qiimaha saxda ah (true value), waxaa la yiraahdaa waa ka sax badan yahay.
- Qalabku wuxuu bixiyaa qiyaas awoodda muhiimka ah (vital capacity).
- Qiyaastu waa qiime qumman (approximate) oo ah qiime tiro (quantity) (oo la helay iyada oo aan la qaadin cabbirro sax ah).