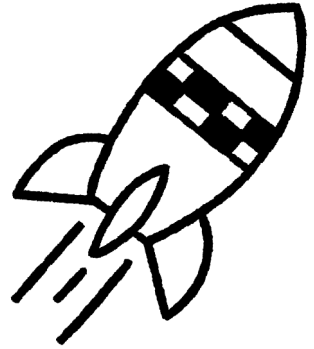


Koronto (Current) dhex mara electromagnet-ka

Sayniska

Cutub: Magnet-yada iyo electromagnet-yada



Natiijo

Waxaan qorsheyn karaa tijaabo (experiment) si aan u tijaabiyo xoogga electromagnet-ka oo aan u sharaxo sida arrimo kala duwan u saameeyaan xoogga electromagnet-ka.

Erayada muhiimka ah

**doorsoomaha madaxa-bannaan
(independent variable)**

doorsoomaha uu qofka sameynaya tijaabada (experiment) beddelo

**doorsoomaha ku-tiirsan
(dependent variable)**

doorsoomaha uu qofka sameynaya tijaabada (experiment) qiyaaso

**doorsoomayaasha xakamaynta
(control variables)**

doorsoomayaasha saameyn kara doorsoomaha ku-tiirsan (dependent variable) oo waa in la isku midaystaa

**tijaabo caddaalad ah (fair
test)**

tijaabo (experiment) lagu hayo doorsoomayaasha xakamaynta (control variables) isku mid

**xudunta birta jilicsan (soft
iron core)**

xarunta electromagnet-ka xooggan oo noqota mid magnetized

Koronto (Current) dhex mara electromagnet-ka



Arrimaha saameeya xoogga electromagnet-ka

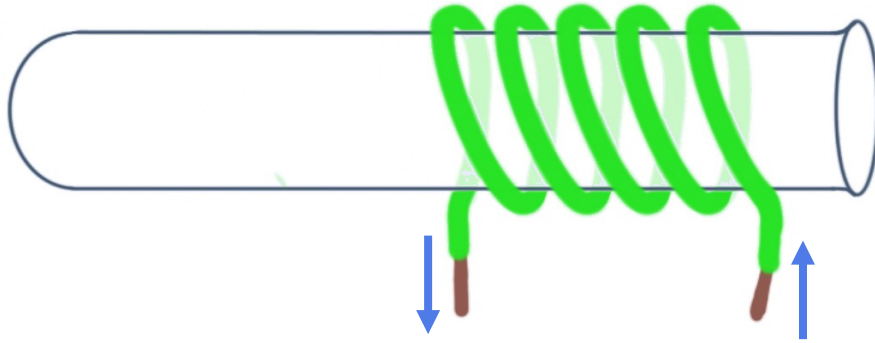


Kordhinta xoogga electromagnet-ka



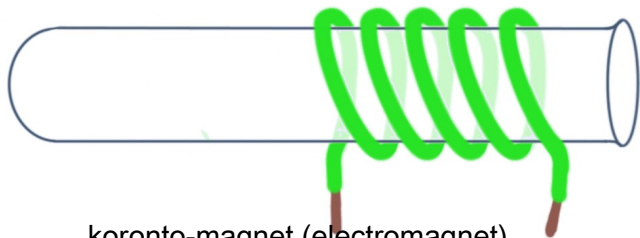
Xudunta birta jilicsan (soft iron core)

Gariiradda electromagnetic-ka waxaa lagu samayn karaa iyadoo la duubo silig dahaaran oo ku wareegsan tuubbo karin.

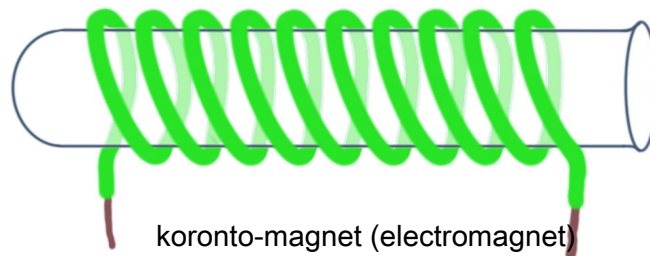


Marka koronto (current) uu qulqulo gariiradda, waxaa soo bixi doona goob magnetic (magnetic field).

Kordhinta tirada wareegyada (turns) ee gariiradda (coil) korantada (electromagnet) waxay kordhinaysaa xoogga (strength) magnet-ka.

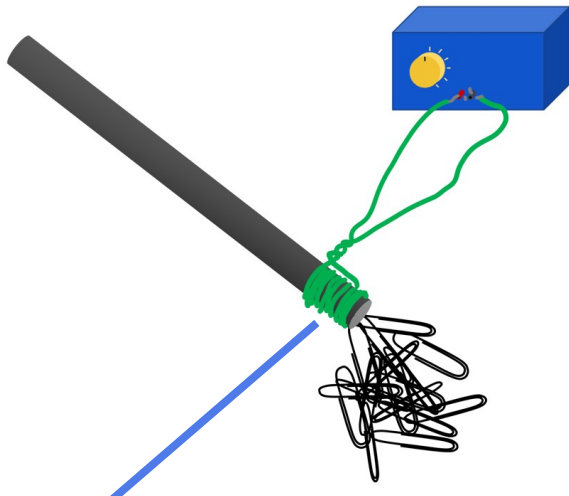


koronto-magnet (electromagnet)
daciif ah



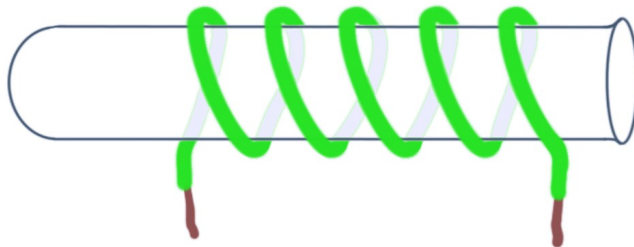
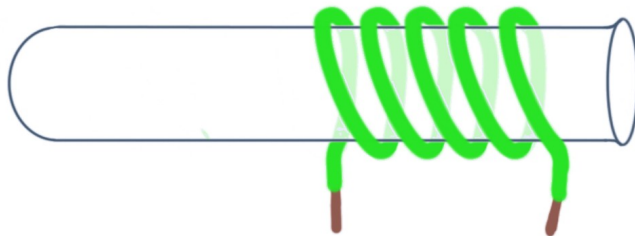
koronto-magnet (electromagnet)
xoog badan

Kordhinta tirada wareegyada (turns) waxay u oggolaaneysaa koronto-magnet-ka (electromagnet) inuu soo qaado warqado (paper clips) dheeri ah.



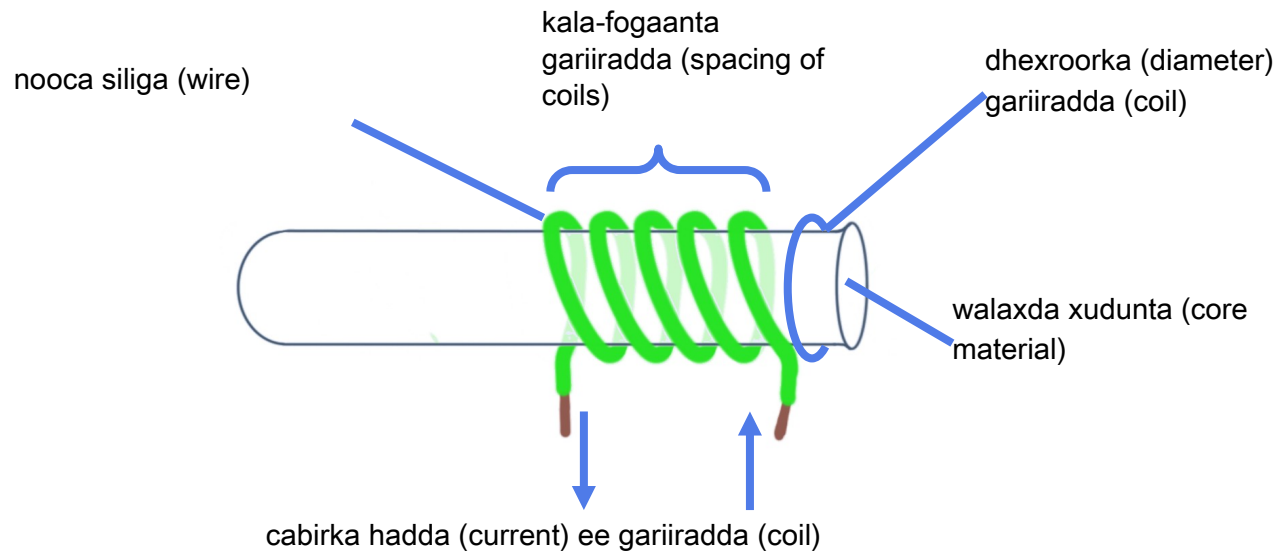
soo qaado warqado (paper clips) dheeri ah.

Haddii wareegyada (turns) la kala fidiya, koronto-magnet-ku (electromagnet) wuu daciif noqon doonaa.



koronto-magnet (electromagnet) daciif ah

Waxaa jira dhowr arrimood oo laga beddeli karo koronto-magnet-ka (electromagnet).



Arrimaha saameeya xoogga (strength) koronto-magnet-ka (electromagnet)

Mid ka mid ah arrimahan soo socda ma saameyn doono xoogga (strength) koronto-magnet-ka (electromagnet) ee laga sameeyay tuubo karin (boiling tube)?

a

dhexroorka (diameter) tuubada karinta (boiling tube)

b

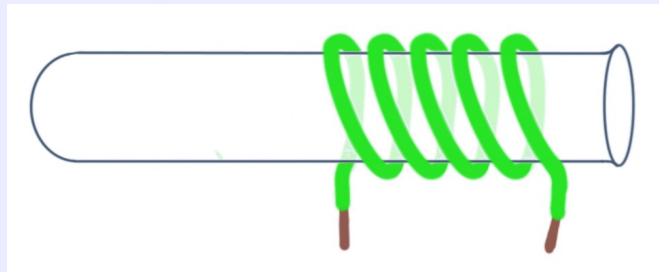
tirada wareegyada (turns) siliga (wire)

c

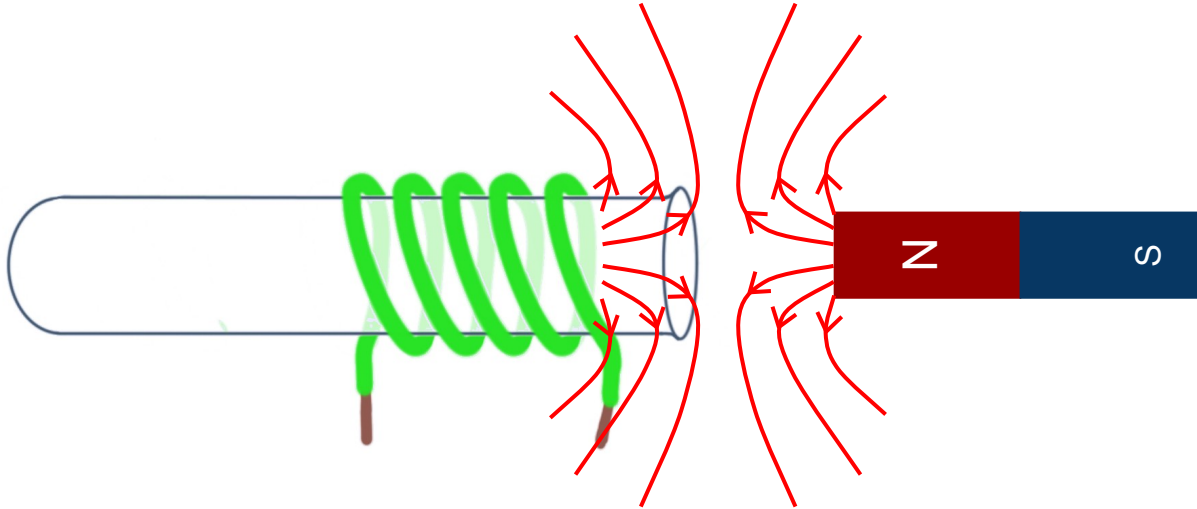
kala-fogaanta wareegyada (turns) siliga (wire)

d

dhererka tuubada karkarinta (boiling tube)



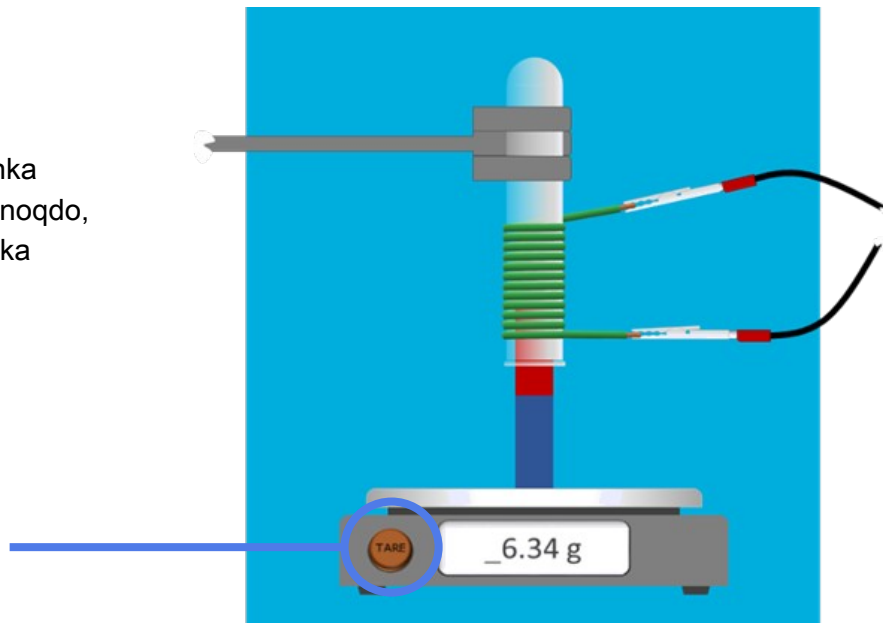
Marka magnet la keeno meel u dhow electromagnet-ka, waxaa lagu celin doonaa (ama lagu soo jiidi doonaa) goobta magnetic-ka (magnetic field).

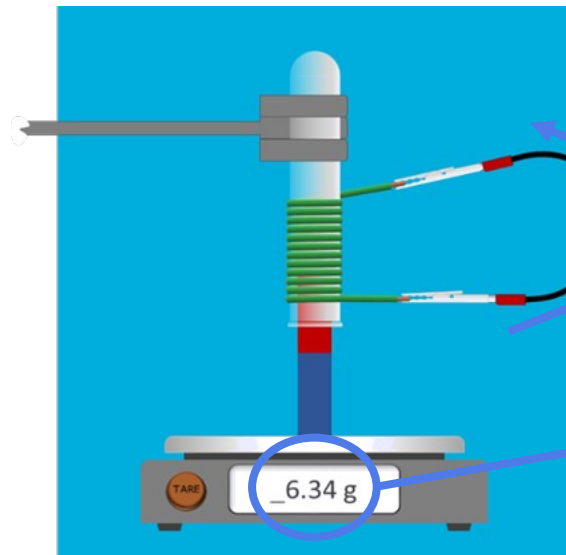


Jaantuskani wuxuu muujinayaa celin (repulsion). Cabbirka xoogga celinta wuxuu ku xiran yahay xoogga labada magnet.

Saamaynta current-ka ee xoogga goobta magnetic-ka (magnetic field) waxaa lagu tijaabin karaa iyadoo coil-ka lagu xiro magnet-ka ku yaal miisaanka (balance).

Marka uu jiro current aan ku jirin coil-ka, miisaanka (balance) waa la 'tari' karaa (tared) si uu eber u noqdo, marka current la shido, kaliya xoogga magnetic-ka (magnetic force) ayaa la qiyaasaa.





Current-ka waxaa beddelaa qofka sameynaya tijaabada (experiment) waxaana loo yaqaan variable madax-bannaan (independent variable).

Akhriska miisaanka (balance) waa la qoraa waxaana loo yaqaan variable ku-tiirsan (dependent variable).

Variables-ka kale ee saameyn kara xoogga electromagnet-ka, sida tirada wareegyada coil-ka, dhexroorka coil-ka, iyo booska coil-ka, waa variables-ka xakamaynta (control variables) waxayna u baahan yihiin in la isku mid keeno si loo sameeyo tijaabo cadaalad ah (fair test).

Arrimaha saameeya xoogga electromagnet-ka

Maxaa dhici doona haddii magnet kale la keeno meel u dhow magnet-ka ku yaal miisaanka (balance), kor ka yimid, sida ku cad?

a

akhrisku wuxuu ahaan doonaa isku mid

b

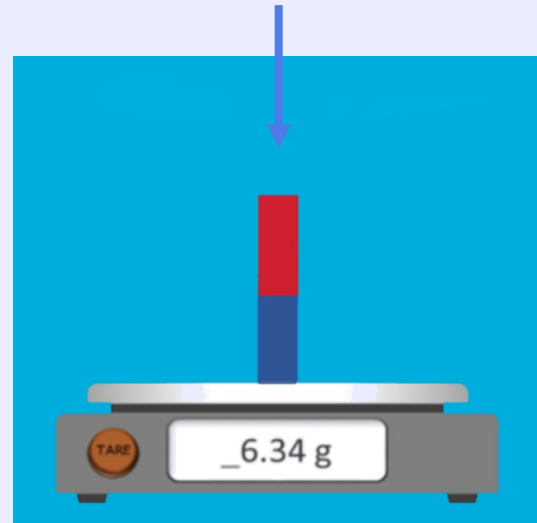
akhrisku wuu yaraan doonaa

c

akhrisku wuu kordhi doonaa

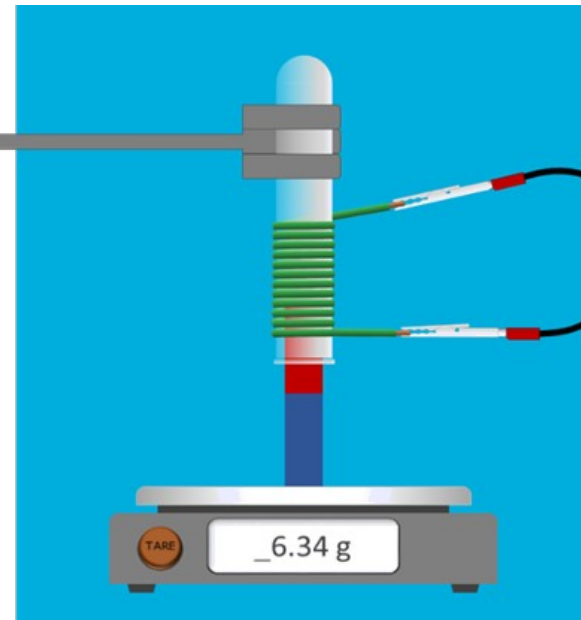
d

akhrisku wuxuu kordhi doonaa ama yaraan doonaa



Qalabka la muujiyay waxaa loo isticmaali karaa in lagu tijaabiyo sida current-ka uu u saameeyo xoogga electromagnet-ka.

- 1) Magacaab variable-ka madax-bannaan (independent variable) iyo variable-ka ku-tiirsan (dependent variable).
- 2) List variables-ka xakamaynta (control variables) oo sharax sida aad u samayn lahayd tijaabo cadaalad ah (fair test).



- 1) Magacaab doorsoomayaasha madaxbannaan iyo kuwa tiirsan (independent and dependent variables).

Doorsoomaha madaxbannaan (Independent variable): hadda (current) ku jira gariiradda (coil)

Doorsoomaha tiirsan (Dependent variable): xoogga (force) saaran miisaanka (balance)

- 2) Liiso doorsoomayaasha xakamaynta (control variables) oo sharax sida aad u samayn lahayd tijaabo (experiment) caddaalad ah.

Doorsoomayaasha xakamaynta (Control variables): tirada wareegyada (turns) gariiradda (coil), nooca siliga (wire), kala fogeynta wareegyada gariiradda, dhexroorka (diameter) gariiradda iyo walaxda ku jirta gariiradda (xudunta/core).

Doorsoomayaashan waa in la isku mid dhigaa inta lagu jiro tijaabada (experiment) si loo hubiyo inay tahay tijaabo caddaalad ah.

Qaabka casharka

Hadda (Current) dhex mara elektromagnet-ka (electromagnet)



Arrimaha saameeya xoogga (strength) elektromagnet-ka (electromagnet)



Kordhinta xoogga (strength) elektromagnet-ka (electromagnet)



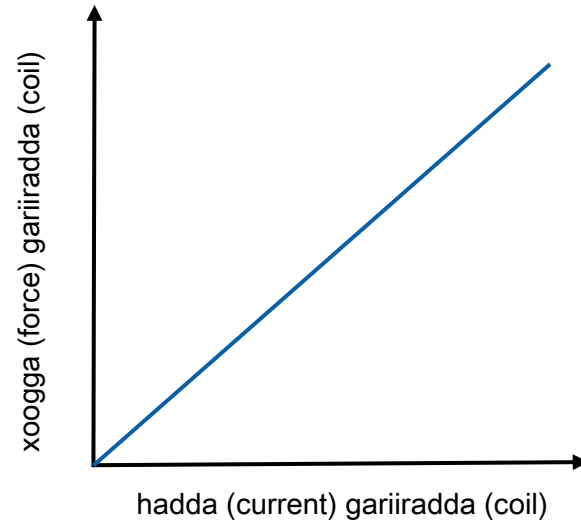
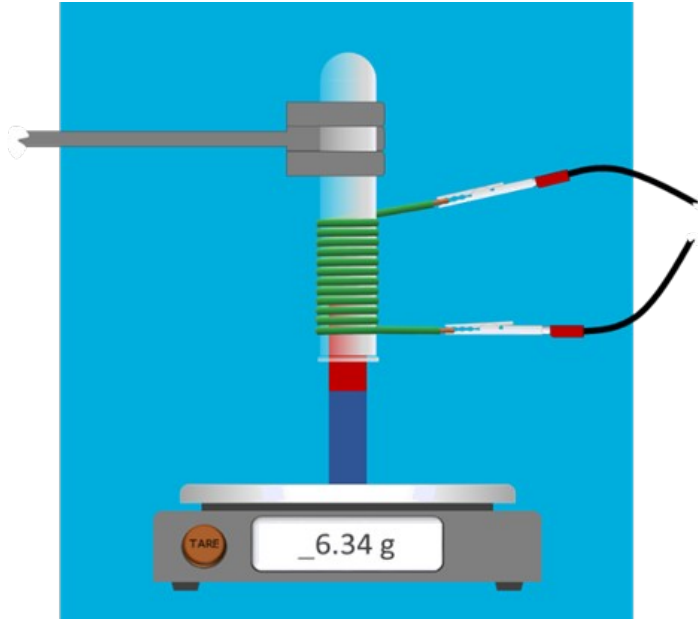
Xudunta (core) birta jilicsan (soft iron)

Kordhinta xoogga (strength) elektromagnet-ka (electromagnet)

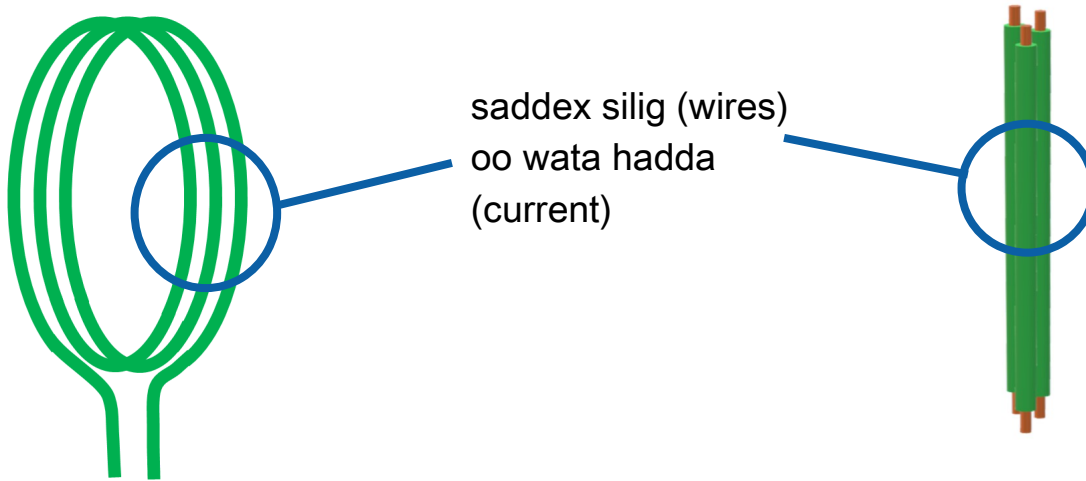


Sharaxaad

Marka hadda (current) gariiradda (coil) la kordhiyo, xoogga (force) ay ku saarto birlabta (magnet) ayaa sidoo kale kordha.



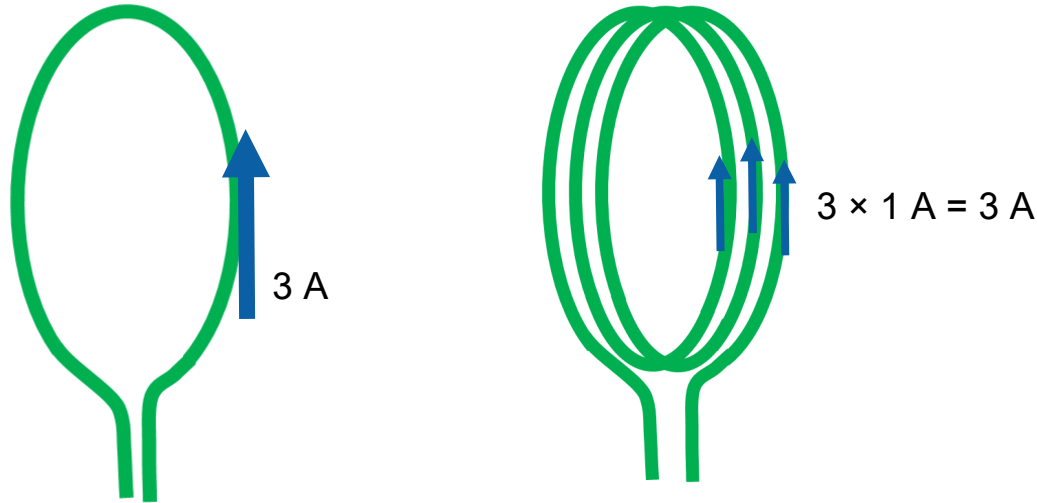
Wareegyada (loops) siliga (wire) gariiradda (coil) waxay la mid yihiin siligyo (wires) kala duwan, mid kastoo wata hadda (current).



Kordhinta tirada wareegyada (turns) gariiradda (coil) waxay keentaa in wadarta hadda (current) qulqulaya ay kordho.

Kordhinta xoogga (strength) elektromagnet-ka (electromagnet)

Gariirad (coil) leh hal wareeg (turn) oo wata 3 A waxay lahaan lahayd saameyn la mid ah gariirad leh saddex wareeg (turns), mid kastoo wata 1 A.



Waa wadarta hadda (total current) wareegyada (turns) gariiradda (coil) ee muhiimka ah.

Kordhinta xoogga electromagnet-ka

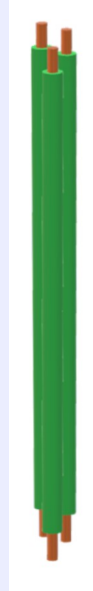
Fiilooyinka (wires) ama koox fiilooyin, kee bixiyaa xoogga magnetic-ga (magnetic field) ugu xooggan?

current = 4 A



a

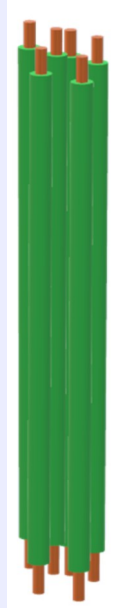
current = 3 A fiilo
kasta



b



current = 1 A fiilo
kasta



c

Kordhinta xoogga electromagnet-ka



Sharaxaad

Qalab sida drill wuxuu isticmaalaa electromagnet.

Bedelida xoogga electromagnet-ka waxaa ugu fudud in lagu beddelo current-ka (current) ee coil-ka.

Bedelida coil-ka laftiisa waxay noqon doontaa mid aad u adag.

Qalabka iyo aaladaha intooda badan ee isticmaala electromagnet waxay beddelaan current-ka si ay u beddelaan xoogga magnetic-ga (magnetic field).



Kee ka mid ah kuwan soo socda ma beddeli doono xoogga electromagnet-ka?

a

midabka fiilada coil-ka



b

current-ka (current) ee coil-ka

c

tirada wareegyada (turns) ee coil-ka

d

dhexroorka (diameter) coil-ka

- 1) Tax qodobbada (factors) beddeli kara xoogga electromagnet-ka.
- 2) Sharax sida fiilo sidaysa current yar (low current) loogu isticmaali karo in laga dhigo electromagnet xooggan.

1) Tax qodobbada (factors) beddeli kara xoogga electromagnet-ka.

Arrimaha bedeli kara xoogga korantada (electromagnet) waa: hadda (current) ku jira gariiradda (coil), tirada wareegyada (turns) gariiradda, kala fogeynta wareegyada gariiradda, dhexroorka (diameter) gariiradda iyo walaxda (material) xudunta (core).

2) Sharax sida silig (wire) sidaya hadd (current) hoose loo isticmaali karo in lagu sameeyo koronto-birlabeed (electromagnet) xoog leh.

Siligga (wire) waxaa lagu duubi karaa xudun (core) si loo sameeyo koronto-birlabeed (electromagnet). Haddii wareegyo (turns) badan la duubo, hadda hoose (low current) wuu isku daraa, mid kasta oo wareeg ah, wuxuuna sababi doonaa goob birlabeed (magnetic field) xoog leh.

Qaabka casharka

Hadda (current) maraysa koronto-birlabeedka (electromagnet)



Arrimaha saameeya xoogga koronto-birlabeedka (electromagnet)



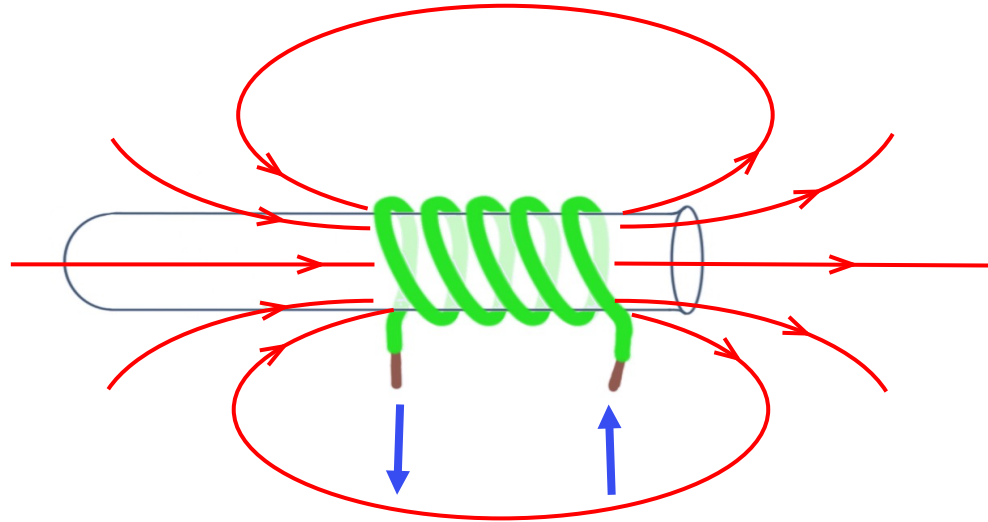
Kordhinta xoogga koronto-birlabeedka (electromagnet)



Xudun bir jilicsan (soft iron core)

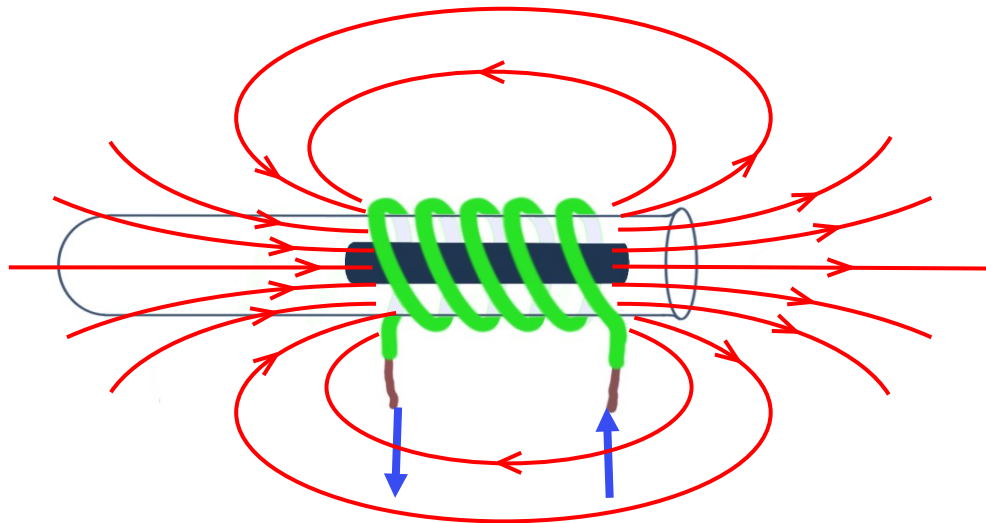
Xudun bir jilicsan (soft iron core)

Gariirad (coil) silig (wire) sidaya hadda (current) waxay sababi doontaa goob birlabeed (magnetic field).

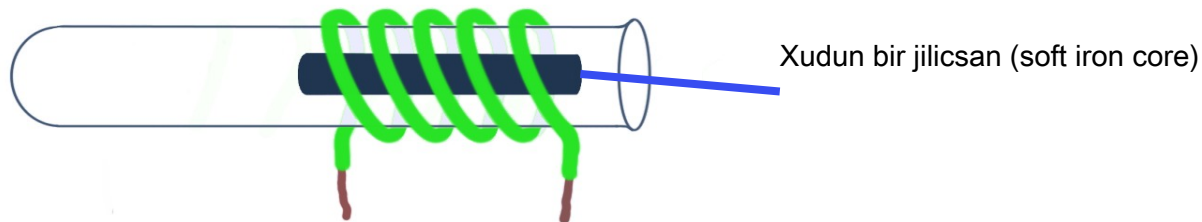


Ku darista xudun bir (iron core) dhexda gariiradda (coil) waxay ka dhigi doontaa goobta birlabeedka (magnetic field) mid aad u xoog badan.

Birtu (iron) way birlabeysan (magnetised) oo tani waxay ku darsataa goobta birlabeedka (magnetic field) gariiradda (coil).



Waxaa loo yaqaan 'xudun bir jilicsan' (soft iron core) sababtoo ah bir saafi ah (pure iron) way lumisaa birlabeedkeeda (magnetism) marka hadda (current) joogsato.



Bir saafi ah (Pure iron) waxaa loo yaqaan walax birlabeed (magnetic material) 'jilicsan' (soft).

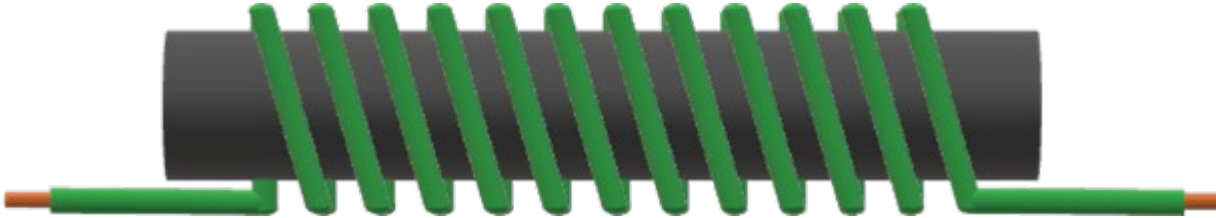
Haddii birta (steel) (oo ah daaw (alloy) bir (iron) iyo kaarboon (carbon)) la isticmaalo, waxay sii ahaan doontaa birlabeysan (magnetised) ka dib marka hadda (current) la damiyo.

Xudun bir jilicsan (soft iron core)



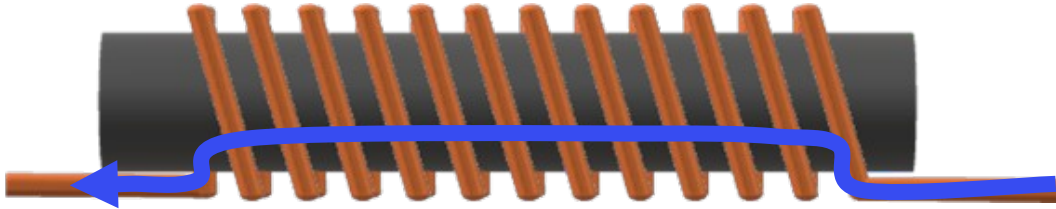
Sharaxaad

Siligga (wire) waxaa si toos ah loogu duubi karaa xudunta birta (iron core) haddii siligga gariiradda (coil wire) uu yahay mid dahaaran (insulated).



Dahaarku (insulation) wuxuu ka hortagaa hadda (current) inuu galo xudunta (core).

Haddii siligu aan la dahaadin, hadda kugu (current) wuxuu si toos ah u dhex mari doonaa nudda (core) isagoon ku wareegin, mana samayn doono electromagnet (electromagnet) xoog leh.

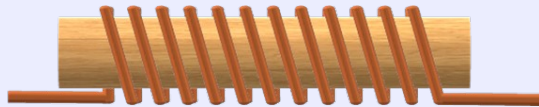


Hadda kugu (current) wuxuu si toos ah u dhex maraa nudda (core) wax-qaada.

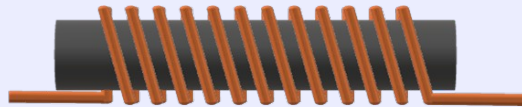
Haddii wareegyada siliga qaawan ay istaabtaan, hadda kugu (current) wuxuu qaadan doonaa dariiqa gaaban.

Nud bir jilicsan (soft iron core)

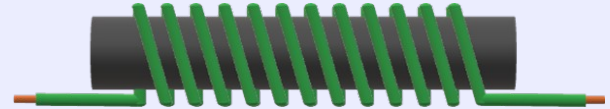
Kee ka mid ah isku-dhafka siligga iyo nudda (core) ee la muujiyey ayaa samayn doona electromagnet (electromagnet) aan shaqayn?



a



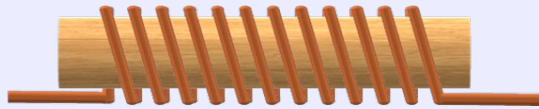
b



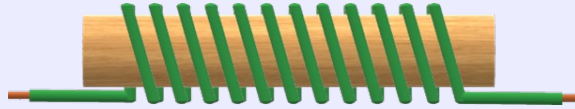
c

Nud bir jilicsan (soft iron core)

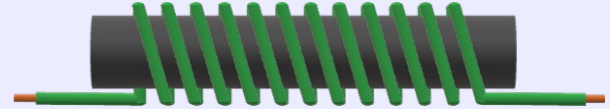
Kee ka mid ah isku-dhafka siligga iyo nudda (core) ee la muujiyey ayaa samayn doona electromagnet-ka (electromagnet) ugu xooggan?



a



b



c



Sharax sida walxaha nudda (core) iyo gariiradda (coil) ay uga dhigi karaan electromagnet-ka (electromagnet) mid ka xoog badan.

Hawsha C Nud bir jilicsan (soft iron core)



Sharax sida walxaha nudda (core) iyo gariiradda (coil) ay uga dhigi karaan electromagnet-ka (electromagnet) mid ka xoog badan.

Nudda (core) ee electromagnet-ka (electromagnet) waa in laga sameeyaa bir 'jilicsan' oo noqon karta magnetised (magnetised). Tani waxay ku dari doontaa goobta magnetic (magnetic field) waxayna ka dhigi doontaa magnet-ka (magnet) mid ka xoog badan. Waa in la isticmaalaa bir 'jilicsan' si electromagnet-ku (electromagnet) u luminayo magnetism-kiisa marka hadda kugu (current) la damiyo.

Gariiradda (coil) waa in laga sameeyaa silig bir ah oo dahaaran si hadda kugu (current) uusan u dhex marin nudda (core) laakiin uu u maro wareegyada ku wareegsan nudda (core).

Soo koobid

Hadda kugu (current) dhex mara electromagnet-ka (electromagnet)

Electromagnet-ka (electromagnet) waxaa lagu samayn karaa iyadoo silig lagu duubo nudda (core) oo hadda kugu (current) lagu maro wareegyada gariiradda (coil).

Qodobbada saameeya xoogga electromagnet-ka (electromagnet) waxaa ka mid ah: hadda kugu (current) ee gariiradda (coil), tirada wareegyada ee gariiradda (coil), dhererka iyo dhexroorka gariiradda (coil) iyo walxaha nudda (core).

Nud bir jilicsan (soft iron core) waxay kordhisaa xoogga electromagnet-ka (electromagnet) sababtoo ah waxay noqotaa magnetised (magnetised).

Hadda kugu (current) wuxuu dhex maraa gariiradda (coil) laakiin ma dhex maro nudda (core).

