Cutubka 4ᵃᵃᵈ

HAWL, JAMAR, IYO AWOOD

Ujeedooyinka cutubka

- ✓ Cutub kani marka uu dhamaado ardaydu waxay awoodi doonaan:-
- ✓ Fahan ka laxidhiidha fikradaha hawsha, Tamartaiyo awooda.
- ✓ Abuurida xirfadaha lagu soosaarayo masalooyinka laxidhiidha, hawsha, tamarta iyo awooda.
- ✓ Samaynta isku xidhnaanta shayyada oodhan
- ✓ Isticmaalida suurtagalinta baaxad leh, oo lagu hormarinayo fikirka aqoonta ugu muhumsan ee fiisigiska.

Hordhac

Saddexdii cutub ee hore waxaad kusoo barateen Astaamaha xadi saleedyada, cabbirka xaddi saleed yada, halbeegyadooda, socodka walxaha, xoog, iyo xidhiidhka ka dhexeeya xoogga iyo socodka. Cutubkana waxaad kubaran doon taan fikradaha Hawsha, Tamarta, Awoodiyo xidhidhka kadhexeeya waa maxay hawsha? Sidee baan uqeexeynaa Tamarta.

Dadku badanaaba waxay ka fikiraan hawshu waxay tahay? Laakiin waxaa lagumagacaa baa in ay tahay wax la qabanayo.

Laakiin hada waxaan rabnaa inaan saynis a haan uqeexno macnaha hawsha Tamarta iyo Awooda iyo xidhiidhka ka dhexeeya. Tibixda Tamar ayaa macnaheedu aad ubalaadhan yahay cutubkana waynu ku faah Faahin doonaa. Hadaba cutubka marka aynu eegno famavtu waynoocyo badan tahay. Sida tamartu guud, tamarta socodka, iyo tamar keydsan.

4.1 Hawsha

Hawlgalka 4.1

Wada falanqeeya adiga iyo saaxii badaa su, aalaha soo socda.

- i. Waamaxay hawsha aynu qabano maalintii mahcaan neegno fii'sig is ahaan.
- ii. Goor maan odhan karnaa hawlbaa laqabtey?
- iii. Qeex, ama sharax tibixda hawsha adigoo uqeexaya saynis ahaan ama fiisigis ahaan.

Marka aynu eegno falanqeynta Hawl galka 4.1 waxhan kala kulmi karnaa macnayaal kala duwan oo hawsha ah.

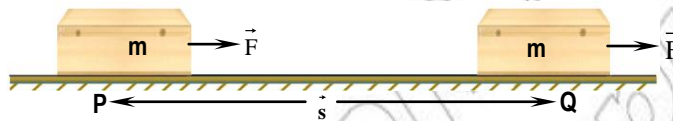Hadaba badanaa waykala duwan yihin macnaha ay dadku uqeexaan iyo macnaha uu saynisku uqeexo.

Waxqabadka maalin kasta:- tibixda hawsha. Waxaa loo isticmaalaa iney iskumid yihiin hawsha maskaxda laga qabtey iyo hawsha ay murquhu xoog ku qabteen.

Caddee kuwan soo socda hawl laqabtey inaan hawl laqaban.

- Waxaad akhridey buug.
- Kumash quntinaf taada (maskiax daada) ka fikirid aadka fikireysid dhibaato fududiyo midculus.
- Waxaad kor uqaaday culeys adigoo dhaqaaqin, ama waxaad kor uqaadey culeys adiga oo ku dhaqaaqaya socod madoor some keynaan Jiifa

Hadaba wax qabadyadaas dhamaantood marka loo eego qeexi taana sayniska ma, aadan qaban wax hawl ah. Marka, loo eego qeexitaan Fisigiska hawsha waxaa laqabtay marka tamartu ay iska badasho qaab ee ay isu badasho qaab kale.

Hawsha waxaa laqabtaa marka xoog loo adeeg sado walaxda, oo ay walaxdu dhaqaaqdo fogaanta (s) dhinac Jihada xooga.

Jaantuska. 4.1 xoog $\vec{F}$ wuxun qabtey hawl.

Sida Jaantuska 4.1 xoog (F) waxuu dhaqaa Jiyey walaxda cufkeedu yahay (m) isagoo kadhaqaa Jinaya Barta (P) ilaa "Q" oo sameenaya ya barabaxa ($\vec{s}$). Sidaas darteed

Hawshu = xooga x barabaxa

$$W = \vec{F} \times \vec{s}$$
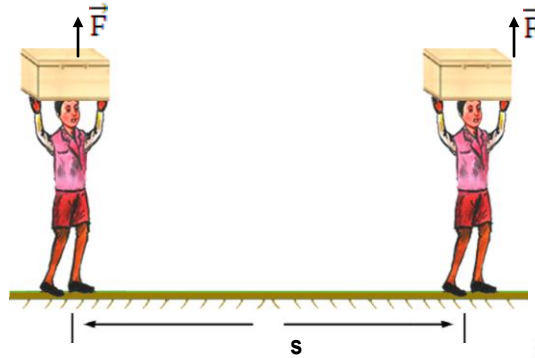
Marka W = hawsha

F = xooga

S= bara – baxa

> **Hawshu waxay lamid tahay taranta xoogaiyo bara baxu ay sa meeyeen in kastoo xooga iyo bara- baxu ay yihiin xadi – leebyo, laakiin Hawshu waa xadi foolwaa.**

> **Marka shay culus dhulka kor uga qaadid ee aad dul dhigtid Khaanad waa Tu saale fi can oo ah hawsha.**

Hadaba haddii xooga loo falo Jihada aaney walaxdu usoconin marka qaybaha xooga iyo jihooyinkooda, ayuun baa hawsha qabanaya haddii xoog loo adegsaday walaxdu aanu sameynin fogaan oo uu ahaato midnegi, markaa wax hawl ah laguma qaban xooga.

Hadaba xoogu waa inuu yeesho qaybo kala duwan ama jihooyin kala duwan oo uu u socdo.

Qof socod, da Fogaan, isaga oo wada walax leh culeys, maqaban wax howl (ah Isaga oo walax sida (Jasntaska 4.2).

Jaantuska 4.2 Nin wada walax oo socday fogaan (S) oo cufka walaxduyahay (m).

Hawlgalka 4.2

Wada falanqee ya adiga iyosaaxiibadaa Hawsha uu qabtey nin wada culeys oo socday fogaan.

Halbeega caalamiga ah ee hawshuna waa Newton x meter (NM) kaas oo loo ya qaano Joul (J).

Hal Juul oo hawl ah ayaa la qab tey marka uu xooga Newton (N) dhaqaajiyo walax, barabax dhan 1 mitir (m).

Markaa: −

1 Juul (I) = 1 Newton (N) x 1 mitir (m).

Halbeega hawshu "Joule" waxaa loogu magac daray saynisyahankii caanka ahaan ee ahaa Inqiriska ee la adhan Jirey:-

"Dames Prescott Joule, Sanadkii (1818-1989) saynisyahan ka oo soosarey waxyaabo fara badan oo kusaab san tamarta kulka marka aynu cabireyno xadi weyn ama xadi yar oohawl ah waxay na isticmaa leynaa horgaleyaasha Juulka, sida. Kilo Juul ka (KJ) mega Juule (MJ), milli Joule (mJ) iyo wixii lamid ah.

Tusaale ahaan

> **1 Kilo Joule = 1000 J**
> **1 Mega Joule = 1000,000J**
> **1 mili Joule = 0.001 J**

Tusaale 4.1

1. Sanduuq ayaa lagu riixey xoog dhan 180N isaga, oon karaarin fogaan dhan 5m si jiifto ah sibidh ka dushisa. Hadaba waa imisa hawsha laqabtey?

Siin	Waydiin	Fur-furis
F = 180N	W = ?	$W = \vec{F} \times \vec{s}$
$\vec{s}$ = 5m		W = 180N × 5m
		= 900N.m
		= **900 J**

2. Cuf ayaa labara – bixiyey fogaan dhan 20m, iyadoo loo adeegsadey xoogdhan 100N.

   b) Waa imisa hawsha laqabtey?

   t) in tee bay noqo neysaa hawshu ? haddii xoogu laban laabmo, bar – baxuna, aanu is bedelin.

   J) intee bay no qoneysaa hawsha, haddii fogaanta lakala badho, oo aanu xoogu isbadalin.

Siin	Waydiin	Fur-furis
b) $\vec{F}$ = 100 N	W = ?	W= $\vec{F} \times \vec{S}$ = 100N × 20m = 2000 N.m = 2000 J = 2KJ
t) F= 200N	W = ?	Fur-furis W= $\vec{F} \times \vec{S}$ = 200N × 20m = 4000J = 4KJ.

∴ Marka Xooga lalaban laabo sidookale hawshana way laban lab may saa.

j) Kalabadhka 20m = 10m, S= 10m

   W= $\vec{F} \times \vec{S}$ = 100 N × 10m = 1000 NM.

   = 1000J = 1kJ

3. Waa in tee xooga kor loogu gaadi karo culeys dhan 50kg, Joog dhan 2m. Haddii hawsha laqabtey ay tahay 1000 J.

Siin	Waydiin	fur-furis
W= 1000J	F = ?	W = F × S

$$F = \frac{W}{S} = \frac{w}{s} = \frac{1000J}{2m} = 500 \text{ N}$$

Xaqiijinta 4.1

1. Sheeg xaaladaha hawsha lagu qabto?
2. Qor is le, egta loo isticmaalo xisaabinta hawsha, summado ahaan?
3. Xisaabi Hawsha uu qabtey maslax marka uu culeys kor ugu qaato xoog dhan 20N. Joogdhan 1.5m.
4. Maxaa kudhacaya hawsha marka xoogu laban laabmo, ee aaney fogaantu isbedelin?

4.2 Tamarta

Hawlgalka 4.3

Wada falaaqeeya adiga iyo saaxiibadaa kuwan soosocda:-

i.   Dhagax kor uqaad, miyaad adeegsa tey tamar.
ii. Hada dhagax tuur, ooku Jabi dhagax yar oo kale ama loox.
iii. Waa maxay tamartu?
iv. Sharax, xidhiidhka kadhexeeya hawsha iyo tamarta.

   • Maxay walaxdu ku qabataa tamar teeda?
   • Sidee baan ucbiri karnaa tamarta walaxda?

Qeybihii hore waxaan kusoo baraney hawsha iney tahay wax ay qabatey walaxi cutubkana waxaan kubaranaynaa tamartu iney tahay waxa ay walaxi iska, leedahay. Hadaba waxaan lee nahay walax du waxay lee dahay tamar, marka ay karey so iney hawl qabato.

Sidaas darted tamarta waxaan ku cabbir karnaa xaddiga howsha ee ay walaxdu qabatey.

> **Tamartu waa kartida hawl lagu qabto Tamartu waa xadi foolwaa sida hawsha Halbeega caalamiga ah ee tamartu wuxuu lamid yahay halbeeg caalamiga ah ee hawsha waana Joule (J).**

Hawlgalka 4.4

Wada Falan qeeya adiga iyo saaxii badaa su, aalahaan soosocda.

i.   **Sharax Noocyada kala du wan ee tamarta.**

ii.   **Sheeg nooca tamarta ee aad u malayneysid in wadankeena aad looga isticmaalo**

iii.   **Wada falan qeeya tamartu sida isugudubto.**

Caalaman kan aan ku noolahay waxaan ku aragnaa noocyo kala duwan oo tamar'ah sida.

- Tamarta danabka
- Tamarta kiimikaad.
- Tamarta (Niyuukleerka)
- Tamarta cad-ceeda
- Tamarta Jabaqde
- Tamarta Kulka
- Tamarta Guud
- Tamarta dabaysha
- Tamarta biyaha I. W. M.

Qaybtana waxaan muhimada saareynaa Tamarta guud, Tamarta guud waa tamar aywalaxdu leedahay marka loo eego socodkeeda ama nagaanshaheeda marka ay dultaalo oogada dhulka.

Hadaba waxaa Jira laba nooc oo tamarta guud ah kuwaas oo kala ah

i)   Tamar socod (K.E).

ii)   Tamar negi (P.E).

> **i) Tamarta socod (K.E). Tamarta socodku waa tamarta ay wa laxdu lee dahay marka ay socod sameyso.**
>
> **Tusaale ahaan :- Baabuur soconaya, dhagax la tuurey, Taayir wareegaya I. W. M Waxay lee yihiin tamar socod marka loo eega socod kooda.**
>
> **Tamarta socod ee walax leedahay cuf, ah (m) waxay kusoco taa xa waare (V) Marka xisaab ahaan waxaa loo qeexi karaa sidan:-**
>
> $$K. E. = \tfrac{1}{2} mv^2 \text{ (Cufka) (xawaare)}^2$$
> $$K.E. = \tfrac{1}{2} mv^2$$
>
> **Tamarta socod ku waa xadi fool waa waxay leedahay laxaad kaliya.**

Tmsaale 4.2

Xabbad leh cuf dhan 20g ayaa lagu direy xawaare dhan 250m/s. Waa imisa tamartiisa socod?

Siin	Waydiin	Fur-furis
m = 20g = 0.02kg **v** = 250m/s	K.E = ?	K.E = ½ mv^2 = ½ × 0.02 kg. (250 m/s)^2 = ½ × 0.02 × 62500 (kg. m^2/s^2) K.E = 625 j

su, aalo, furan

Wada falan qeeya adiga iyo saaxi badaa tamarta socod ee buulet ee aan tasaalaha kore kusoo sheegney marka:-

b) Keynaan ku yahay madoorsoome, laakiin cufka aan laban laabno.

t) cufku uu yahay madoorsome, laaki in keynaanku uu laban laabmo.

> **Tamarta negi (P.E): Waa tamarta neg soo ururta walaxda marka ay walaxdu taalo oogada dhulka, tusaale ahaan ka qaadis tnag caro ha dhulka dushisa waxay lee yihiin tamar negi. Tibixda (negi) waa keydsan.**
>
> **Tamarta negi ee walaxda cufkeeduyahay (m) kor loogu qaado Joog ah (h) dhulka dushiisa waxaa xisaab ahaan loo qeexi karaa.**
>
> **P.E. = culeyska x Jooga (Marka:- W= mg).**
>
> **P.E. = mgh marka:-**
>
> > **P.E. = Tamarta negi**
> >
> > **M = cufka walaxda**
> >
> > **g= cuf – isjiidadka**
> >
> > **h= Jooga walaxda**

Kani waa qeexi taanka tamarta negi ee ay walaxi leedahay marke loo eego meesha ay taalo meel. Waxaad kubaran doontaan fasalad sare Noocyo Kala oo tamar negi.

Tusaale 4.3

Dhagax cuf kiisu yahay 80kg ayaa kor loogu qaaday dhismo dherer kiisu dhan yahay 30m.
- Waa imisa tamar negi ee dhaxan Kordhiyey marka (g = 10 m/s^2).

Siin	Waydiin	Fur-furis
m = 80kg h = 30m g = (10 m/s^2)	P.E=?	P.E = mgh = 80g × 10m/s × 30m = 24000J = 24 KJ

Tasaale 4.4

1. Waa in xawaaraha baabuur cuf kiisuyahay 800kg oo leh tamar socod oo dhan 640KJ?

   Haddii uuc ufku kala badh mo, tamarta socodna aaney isbadalin?

Siin	Waydiin	fur-furis
m = 800 kg	v = ?	$K.E. = \frac{1}{2}mv^2$
K.E = 640,000J		$\Rightarrow 640,000J = (\frac{1}{2} \times 800 \text{ kg}) v^2$
= 640 kJ		$\Rightarrow v^2 = \dfrac{640,000J}{400 \text{ kg}}$
		$v^2 = 1600 \text{ m}^2/s^2$
		$v = \sqrt{1600} = 40 \text{m/s}$

- Haddii cufka baabuurku kala badhmo Sida m = 400kg, markaa K.E = ½ mv²

$$640,000 = \frac{1}{2} \times 400 \text{ kg} \times v^2$$

$$v^2 = \frac{640,000J}{200kg} = 3,200 \text{ m}^2/s^2$$

$$v = \frac{200 \text{ kg}}{\sqrt{3,200}} = 56.57 \text{ m/s}$$

$$v = \sqrt{3,200} \approx 56.57 \text{m/s}$$

2. Wiishka loo isticmaalo in waxlagu qaado marka, dhisma, dhaadheer la dhisayo ayaalagu qaadey walax cufkeedu dhan yahay 320kg. si loo gaadh siiyo dhismo Joogiisu uu dhan yahay 40m markaa waa imisa tamar uuku qaadayo wiishku?

Jaantaska 4.3 wiish.

Siin	Waydiin
m = 320 kg	P.E = ?
h = 40 m	
g = 10m/s²	

fur-furis

Marka walaxdu waxay leedahay tamar negi.

P.E = mgh

= (320 kg) (10m/s²) (40 m)

= 128,000 J

3. Joog in tee dhan ayaa walax leh cufdhan 100kg kor loogu qaadi Karaa, haddii ay leedahay tamar dhan. 1 mJ?

Siin	Waydiin	Fur-furis
m = 100 kg	h = ?	xidhiidhka PE = mgh, waxaan heleynaa
g = 10m/s²		$h = \dfrac{PE}{mg} = \dfrac{1,000,000J}{(100kg)(10m/s^2)}$
P.E = 1 MJ =		
1,000,000 J		Sidaas darteed h = 1000 m

Xaqiijinta 4.2

I.   Sheeg xidhiidhka ka dhexeeye hawsha laqabtay iyo tamarta?

II. Sheeg labada Nooc ee ay tamarta guud ka kooban tahay.

III. Sheeg xadiyada ay tamar ta socod kuxidh tamartu? U Qeex isle, eg ahaan (adigoo istic maalaya summadaha).

IV. Sheeg xadiyada ay tamarta negi kuxidhan tahay? Uqeex isle, eg ahaan (adigoo istic maalaya summadaha).

V.   Kubad leh cuf dhan 0.25kg ayaa lagu Laagey xawaare dhan 20m/s, waa imisa tamarta socod?

VI. b) Sicad uqeex Farqiga udhexeeya K.E iyo P.E.

t) Tusaale kasheeg nooc kasta oo tamarta kamida.

j) miyey tamartu isaga gudub taa KE ilaa P.E. ama isweydaar ataa? Sharaxaad kabixi Jawab taada oo tusaale ku caddee?

4.3 Isugudbinta Tamarta Iyo Keydinta Tamarta

Hawe galka 4.6

Wada faleeqeeya adiga iyo saaxiibadaa
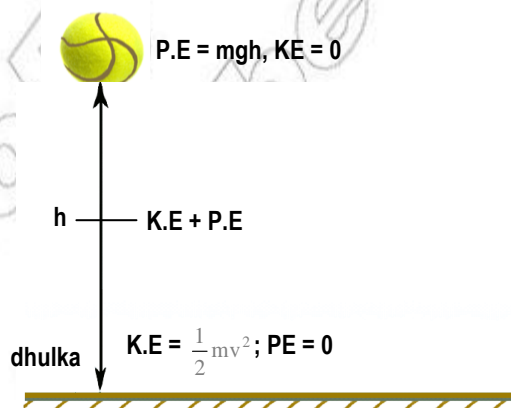
kala duwanaanshaha xaalaadaha soosocda:-

b) Xarunta danab dhalinta (Biyo xidheenka kokada, Biyo xidheenka gill – gill I. W. M.)

Waxaan isticmaalaa tamarta danab dhalinta ee caasimadeheena.

t) Waxaanu isticmaaleynaa tamarta shidaalka in aan wax ku karsano.

J) waxaan u isticmaalaa baytariga tamarta kiimikad si, aan uga shidano tooshka, ama aan ugu dhagaysano raadiyawga.

Maxa kudhacaya noocyada kala duwan ee tamarta? Tamarta miyaa la abuurikaraa ama labur burin kaa? Sharaxaad kabixi

P.E = mgh, KE = 0

h —— K.E + P.E

dhulka   K.E = $\frac{1}{2}mv^2$; PE = 0

Jaantuska 4.4 bedelida tamarta guud.

Hadaba nolol maal meedkeena waxaan isticmaalaa noocyada kala duwan ee tamarta. Tamarta isubedesha ama igudubta, Baahida dadku ayuqabaan, sida. Makiinadaha, koombuterka iyo qalabkale ee lagu qabto hawsha. Tusaale ahaan haddii aan usoo qaadano. Tamarta kiimikaad ee dnuxusha Baadrool

ka, ama gaaska waxay isu bedellaan kul iyo ileys tamar, marka aynu shidaneyno. Laakiin cashirkan waxaan ku eegay naa isugudbida tamarta negi iyo tamarta socod isway daarintooda.

Tusaale ahaan, Fiiri kubada cufka (m) kasoodhac day dusha sare ee dhismaha oo Joogeedu yahay (h). Sida kamuuqada (Jaantusko 4.4).

Marka ay kubadu ku sugantahay dusha sare ee dhismaha waxay leedahay tamar negi oo kaliya.

Taasoo ah P.E= mgh.

Markay kubada bilawdo iney soodhacdo waxay yeelaneysaa tamar negi iyo tamar socod. Tamar-negi ee ay lahayd walaxdu markey dusha sare taaley hadda waxey isu bedelay saa tamar socod.
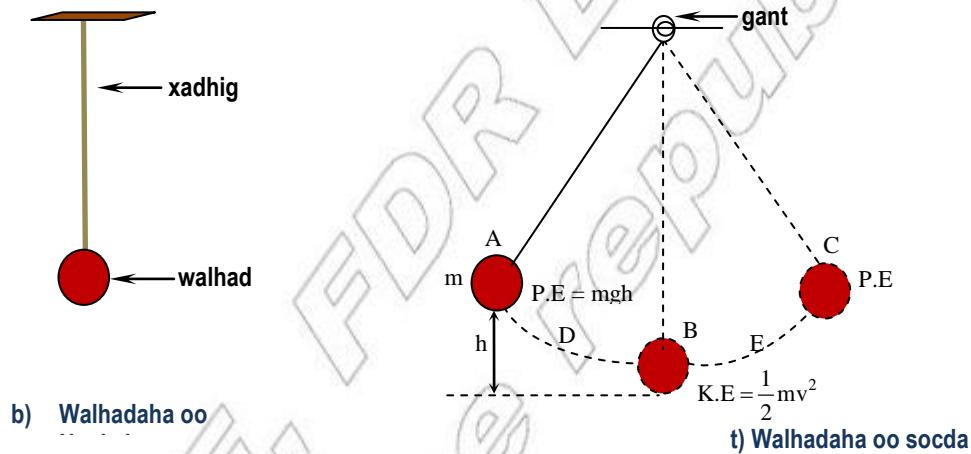
Taasoo ah P.E. + Ke = mgh + ½ mv^2

Ugudanbeyntii kubadu marka ayku soo dhacdo dhulka kubadu waxay leedahay tamar-socod .

Taasoo macnaheedu yahay tamartii negi (keyd). Ee kubada waxay isu bedeshey tamar socod. Wadar ahaan.

Taasoo ah KE = ½ mv^2

Hadaba, Tamrta negi ee dusha dhismuhu waxay lamidtahay tamarta socod ee dhulka dushiisa marka ay kubadu soo gaadhay.

Mgh = ½ mv^2

Jaantaska, 4.5 Isugudibka tamarta guud ee walhadaha fudud.

Hawl – galka 4.7

Ugu shaqeeya hawlgalkan soosocda koox ahaan idinkoo isticmaalaya qalabkan soosocda, kubada walhadaha, xadhig iyo ganto laga soo laad laadiye miis dheer.

    I.   Kuxidh kubada walhadaha barta uu kudh amaado xadhigu adiga oo kor, u sudhaya gantada sida scdakamuuqata (Jaantuska 4.5a).

    II. Barabixi kubada walhadaha barta "A" sida kamuuqata Jaantuska 4.5 (b) oo soo cehir

    III. Sharax xeerka isu gudubka tamarta iyo keydsan ka tamarta.

Hawlgalka 4.7 waxaad xusuusan tihiin walhadaha K.E. iyo P.E ay isku bad badalayaan sijoogto ah. Tamarta kubada walhadaha na dhamaan tamarta negi iney tahay barta "A", sidoo kale tamarta socodkuna waa barta ay iskage midka yihiin (Barta B).

Mee laha kale sida barta diyo E. way leeyihin P.E. iyo K.E. (fiirijaan tuska 4.5b). Badanaba walhaduhu waa is taagey.
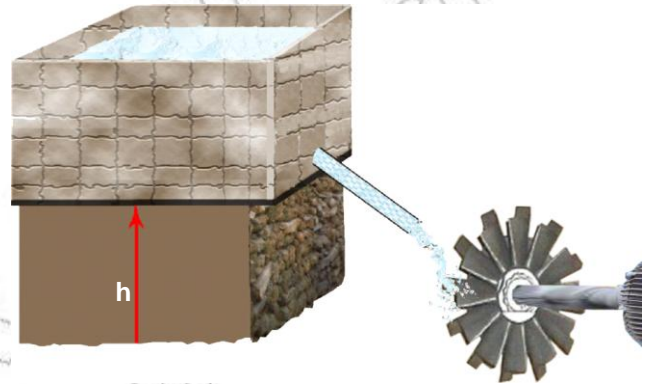
Marka uu istaago Dhamaan tamarta waxay isu badali kulkaasoo ay sababeyso caabiga hawada ee kahor imanaya. Ama isliska hawada.

xeerka keyd sanka tamarta waa midkamida xeerarka guud ee dabiiciga ah waxaynu u qeexaynaa sidan:-

> **"Tamarta lama abuuri, karo, lamana bur- burin karo" Kaliya waxay iskabadashaa nooc waxayna ubadalan taa nooc kale.**

Tamarta biyo soo dhacaya

Tamarta guud ee ay walaxdu leedahay waa tamar negi iyo tamrta socod ama labada Hadaba Hadii aan fiirino isugudubka iyo keydsanka tamarta guud ee biyo soo dhacaya. Biyaha soo dhacayaa waa isha kaliya ee tamarta danab dhalinta ee wadankeena aynaan wali si iskuxig aynaan u isticmaalin.

Jaantuska 4.6 Biyaha kasoo dhacaya taangigu waxay lee yihiin tamar negi iyo tamar socod barta ay kasoo dhacayaan.

Shaxanka kuyaala Jaantuska 4.6 wuxuu ina tusayaa inbiyaha taangiga ku Jiraa inay leeyihiin tamarnegi oo marka loo ee go barta uu yaalo. (M.E. = PE) laakin kadib marka ay biyuhu bilaabaan iney soo dhacaan iyaga oo soo dhex maray. Tuubada (ama qasabada). Waxay yee lanayaa tamar socod, oo uu sababey socodku Tamartan socod waxaa loo is ticmaalaa in lagu Joojiyo makiinada awood dhalinta kadibna mashin ku inuu wareego.

Ugu da beyntii, marka ay biyuhu soo gaadhaan Makiinada dab dhalinta biyuhu waxay leeyihiin tamar socod (M.E= K.E).

Marka ay biyuhu daaxmarayaan tuun bada tamar toodu waxay isugu jirtaa wadarta labada tamarood ee kala ah tamarta negi iyo tamarta socod.

Sidaas tarteed.

M.E. = P.E + K. E

Xusuusnow:- Tamarta Kiimikaad ee biyaha biyo xidheen, kaliya waxay leeyitiin tamarnegi xagooda sare, sidoo kale xaga hoosana waxay ku leeyihi kaliya tamar socod. Tamarta soo dhicitaanka biyuhu waxay inatusay saa in tamarta guud aaney isbadelin oo ay ahaaneyso Joog to.

Tamarta dabaysha

Hawl galka 4.8

- **Waamaxay dabayshu?**
- **Maxaa tamarta lagu qabtaa?**
- **Sheeg tuseele muhiim ah oo tilmaamay waxy aabaha ay dabayshu qabato.**

Sidoo kale Faseexada dabaysha oo laba iyo inkabadan oo kor loogu xidhay meel sare waxay dhaqaajin karaan danabka mishiin ka lagu xidhay Tanina waxay dhacdaa marka dabayshu ay leedahay tamar socod oo wareeJineysa faseexa-daha, sidaas darted dabaysha wareejineysa. Mishiinku waxay soo saartaa qul qul danab. Tamarta danab ee aysoo saar tay dabayshu waxaa loo adeeg sadaa in biyaha lagaga soo qaado ceelasha dhaadheer iyo ileyska guryaha.

Mishiin

Faseexad

Jooge

Jaantuska 4.7 Tamar dhaliyaha dabe yshu Wuxuu tamarta socod ubadal tamardanab.

xaqiiJin 4.3

1. **Maxaad ka Fahan tay tibxahan (b) iskubedelka tamarta (t) keyd sanka tamarta.**
2. **Sheeg xeerarka keysan ka tamarta**
3. **Shara xaad kabixi tamar ay lee yihiin biyo meelsare kasoo dhacaya oo ku soo dhacaya dhulka.**
4. **Tamar noocee, ah ayey dabeyshu leedahay? Tusaale kabixi waxa, ay bini aadanku uistic maalaan tamarta dabeysha?**
5. **Fiiri walax soo dhacay sa ama walhade wal hanaya oo waxaad qeexdaa tamarta isbedeleysa markasta?**

4.4 Awooda

Hawlgalka 4.9

1. **Wada falanqe eya adiga iyo saaxii badaa ama xubnaha qoyskiina, macnaha ereyga (Awood). read kula kulantaa nolol maal meedka**

2. **Tusaale kabixi**
   - **A wood duleed**
   - **A wood siyaasadeed**
   - **A wood shaqsi ahaaneed**
   - **A wood**

3. **Waa maxay farqiga adhexeeya a wooda aan la kulano nololmaal meedkeena iyo Awooda ay isticmaalan saynis yahanadu.**

4. **Casha haday bara baxiso shay fogaan dhan 10m,oo ay ku bara bixi so amin dhan 2min sidookale Deqa aybarabixiso shay fogaan lamid ah fogaanta Casha bay ku barabixisay amin dhan 5 daqiiqo, hadaba koodeebaa a wood badan? casha ama Deqa? Sharax kabixi?**

Badanaa waxaa hawsha laqabtaa marka culeysku sameeyo Joog laakin ismaweydino imisa daqiiqo ama saaca dood bay shaqada lagu qabtey.

Sikastaba ha ahaate waxaa laga mamaar maan ah, la firiyo wakhtiga ay hawsha qaadaneyso

A wooda waa xadi saleed kaas oo looqeexi karo saamiga a minta igo hawsha A woodu waa saamiga A minta iyo hawsha laqabtey

A wood = $\dfrac{\text{Hawsna}}{\text{A min int e}}$ **= p=** $\dfrac{w}{t}$

Marka P= A wooda

W= hawsha

T= A minta

Hadaba hawsha, tamarta, iyo a wood a waa xadi foolwa halbeega caalamiga'ah ee a woodu waa joule/ seken Kan oo looyaqaanaa watt. A wood 1w waxa soo saarey marka laiskuqeybiiyo 1 Joule iyo1sakan

Marka xadi weyn oo a wood sameysmo waxaan isticmaaleyna (kw) iyo mega watt markaa

1KW = 100w

1MW = 1000,000W.

Tusaale 4.5

1. Makiinadayaa qaaday cufdhan 50 kg, waxaana kor uqaadatay Joogdhan 60m, mudo 4seken ah xisaabi a wooda ayku qaaday makiinadu? (g= 10 m/s^2)

Siin	Waydiin	Fur-furis
m= 50kg	P= ?	P= w/t markaa
h= 60m		$\therefore$ P= $\frac{W}{t}$ PE =mgh
t= 4 seken		$\therefore$ P= $\frac{mgh}{t}$
g= 10m/s^2		P = $\dfrac{(50\text{kg})(60\text{m})\left(\frac{10\text{m}}{\text{s}^2}\right)}{4\text{seken}}$
Sidaas darted P = 7500 W		
P = 7.5 kw		

2) xisaabi A wooda qasabad Kor u tuuraysa biyo dhan 300 litir, haddi Jooga qasabadu yahay 12m, oo ay amintu dhan tahay 8 seken

Xusuusnow:- 1 kilo littir ee biyaha ahi wuxuu lamid yahay 1kg oo biyo'ah

Siin	Waydiin	Fur-Furis
m= 12m	P= ?	$\therefore$ P = $\frac{mgh}{t}$
h= 8seken		$\therefore$P = $\dfrac{(300\text{kg})(10\text{m/s}^2)(12\text{m})}{8\text{seken}}$
t= 300kg		
g= 10m/s^2		P = 4500w = 4.5 kw

Xaqiijin 4.4

   i.   **Waa intee a wood danabka " mitad" ama " daawe" daawahan oo hawshiisu tahay 2kj amintisuna tahay 1 seken**

   ii. **Baaldi biyo kabuuxaan oo cufkiisu dhan yahay 3kg, ayaa laga soo dawlisay ceel hoos udheer 10m. ayey gabadhi kaga soo saartey ceelka, baaldiga mudo dhan 2 daqiiqo. Hadaba waa imisa a wooda gabadhu? Haddii (g= 10m/s2).**

Soo koobbidda cutubka

Cutubka waxaad kusoo bara teen

- ➢ Hawsha waxaa laqabtaa marka tamari isebedesho
- ➢ Hawsha waxaa laqabtaa marka xoogu sameeyo fogaan, ah dhinaca Jihada xooga W = FS
- ➢ Halbeega caalamiga ah ee hawshaiyo tamartu waa Joule (Joule) (J).
- ➢ Hawsha, Tamarta, iyo Awooda, waa xadiyo foolwaa.
- ➢ Tamarta guud waa wadar ta, tamar ta socod iyo tamarta negi ee walaxda.
- ➢ Tamarta socod ee walaxdu waa tamarta usuurto galisa socodka.
- ➢ Waxaana loo qeexaa sidan
- ➢
- ➢ K E. = ½ mv2
- ➢ Tamrta negi waa tamarta ay walaxdu lee dahay marka ay taalo bar. Waxaan loo qeexaa sidan
- ➢ P.E. = mgh
- ➢ A wood waxaa loo qeexaa inay tahay saamiga A minta iyo hawsha waxaana lagu qeexayaa sidan P= $\frac{w}{t}$

Halbeega caalamiga ah ee awoodu waa watt (w) kaas oo ah Joule / seken (J/S).

Nakhtinka su'aalaha iyo masalooyinka

I. Ku buuxi meelaha banaan erey ama weedha kuhaboon

1. Hawsha waxaa looqee xaa inaytahay taranta _____ iyo _____.

2. Halbeega caalamiga ah ee Hawshu waa _____.

3. _____ Waa kartida hawsha lagu qabto

4. Halbeega hawsha, Tamarta iyo A woodu waa _____.

5. Ji hada Xoog la adeegsadey waa in ay noqotaa _____ fogaan ta. Siloo yidhaahdo hawlbaa laqabtey.

6. _____ Wuxuu in oo sheegaa in tamartu ayna abuurmin ayna burburin laak iin ay isubadasho nooc kale.

7. _____ waa saamiga amminta iyo hawshe.

8. Halbeeg caalamige ee awooduwaa _____.

9. Tamarta guud waa wadarta _____ iyo _____.

II. Fur – fur masaloo yinka soo so cada

1. Xoog dhan 20 N ayaa sanduuq lagu riixay sanduuq leh cufdhan 18 kg, sanduuqaa oo sameeyey bara – bax dhan 6m. waa imisa how sha uu qabtey?

2. Walax leh cuf dhan 20 kg, ayaa kor loogu gaaday dhismo joogiisu yahay 25m waa imisa tamarta negi eeku keydsan walax daas? (haddi g = 10m/s2)

3. Wiish ayaakor uqaaday walax leh cuf dhan 450 kg, waxuuna gaadhsiiyey dhismo Joogiisu dhan yahay 50m, /L/ waxuuna ku gaadh siyey mudo dhan 5seken Haddi (g = 10m/s^2) hadaba waxaad xisaabisaa (b) tamarta negi ee walaxda (t) A wooda, wiishka

4. dayaxgac meed dad sameeyey ayaa cufkiisu dhan yahay 900kg waxaa lagu diray xawaare dhan 1100m/s Hadaba waa in tee tamarta socod ee dayax gac meedku?

5. waa imisa Jooga walax leh cufdhan 2kg oo kor loogu tuurey xawaare dhan 15 m/s) (haddi g= 10m/s2).

6. Daynabo biyood ayaa tuuraysa biyo dhan 200 litir, waxayku tuuraysa Joogdhan 6m., mudo dhan 2 seken (haddi g = 10m/s2)

   Waa imisa Tamar negi)

   Haddi 1litir = 1kg oo biyo,ah

7. Kaawiyad ayaa leh a wood dhan 1000w. Hadaba Hawl in tee dhan ayey ku qaban kartaa mudo hal saac dhan?